

## **Historic, Archive Document**

**Do not assume content reflects current scientific knowledge, policies, or practices.**



AE51  
45

THE 1975 EXCAVATION OF TIJERAS PUEBLO  
CIBOLA NATIONAL FOREST, NEW MEXICO

BY  
LINDA S. CORDELL

WITH CONTRIBUTIONS BY  
GREGORY A. BURTCHARD  
CHERYL A. FERGUSON  
BRONA G. SIMON

Reserve

THE ARCHEOLOGICAL SURVEY OF TIJERAS CANYON

BY  
BYRON B. BLEVINS  
AND  
CAROL JOINER

THE 1976 EXCAVATION OF TIJERAS PUEBLO  
CIBOLA NATIONAL FOREST, NEW MEXICO  
FINAL FIELD REPORT

BY  
LINDA S. CORDELL  
  
WITH CONTRIBUTIONS BY  
STEPHEN L. FOSBERG  
CHARLES K. LUMPKIN, JR.  
BRONA G. SIMON  
DAVID S. WEAVER

ARCHEOLOGICAL REPORT NO. 18

USDA FOREST SERVICE  
SOUTHWESTERN REGION  
DECEMBER 1977

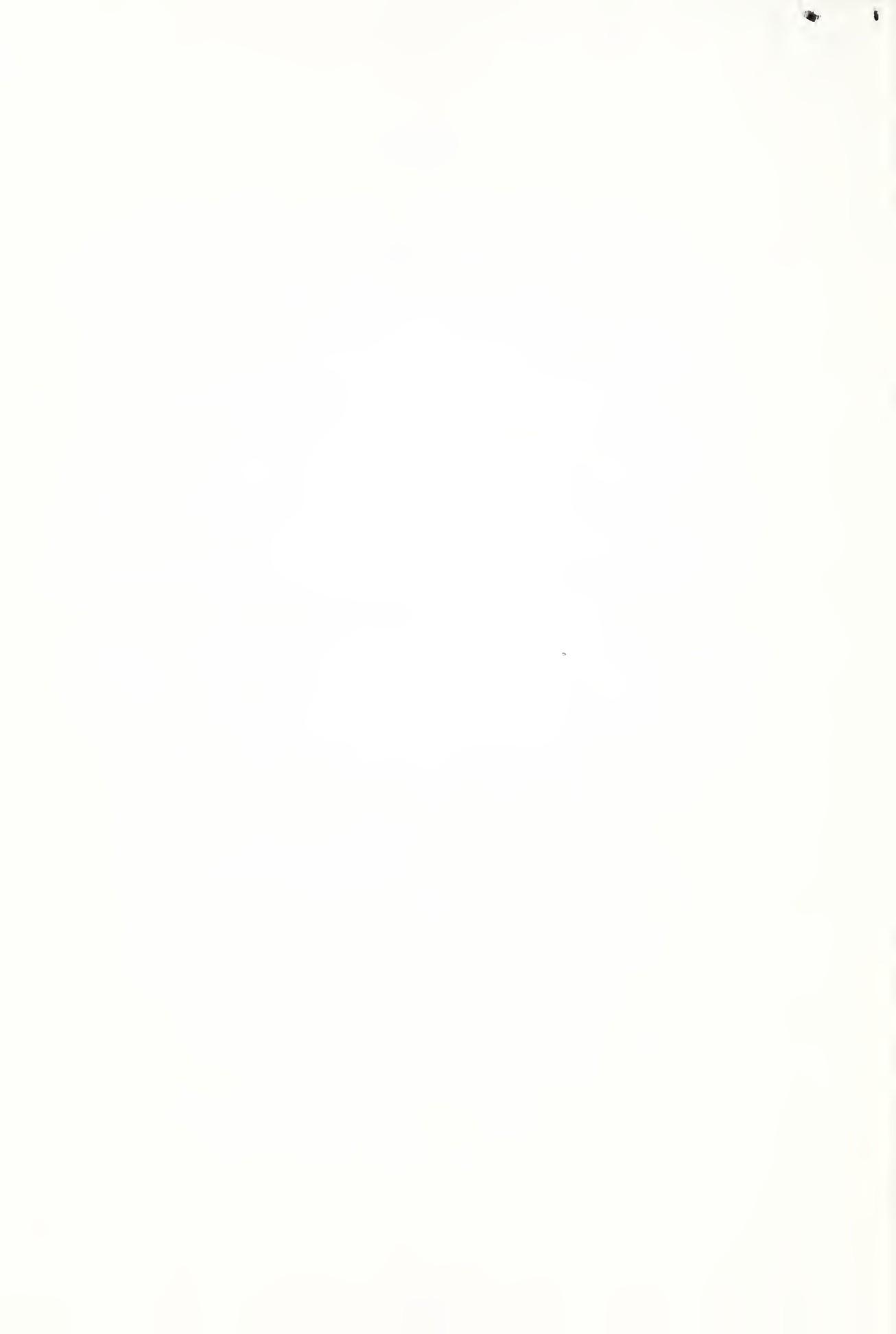
766166

## Preface

Publication of the three following papers brings to a close a series of preliminary reports on the Tijeras Canyon project. The final report, currently under preparation, will be published elsewhere. The Forest Service is pleased to have discharged part of its management obligation to the cultural resources of Tijeras Canyon by making these preliminary reports available. It is particularly gratifying because of the close cooperation maintained by the Forest Service and personnel from the University of New Mexico Field School over a period of several years and because of the quality of the reports that have been produced by Drs. Judge, Cordell, and their students. We hope this will prove to be a precedent setting series of reports both in terms of quality of the archeology conducted and reported and in fostering a desire among other archeologists to cooperate with the Forest Service in our Cultural Resource Management efforts.

I have taken the editorial liberty of reproducing the site maps only once. Maps 1-4 are found in the 1975 report and maps 5-9 in the 1976 report. A special thanks is extended to Solomon Garcia, U.S. Forest Service, Engineering, who prepared the final draft of Charts 1-5 in the Blevins and Joiner report.

Dee F. Green  
Regional Archeologist



THE 1975 EXCAVATION OF TIJERAS PUEBLO

Cibola National Forest, New Mexico

By

Linda S. Cordell

With Contributions By

Gregory C. Burtchard

Cheryl A. Ferguson

Brona G. Simon



## Contents

	<u>Page</u>
I. Introduction	1
II. Research Orientation and Methods	1
Water	2
Wood	3
Food	3
Methods	5
Significance	6
III. The Environmental and Cultural Context of Tijeras Pueblo	7
The Natural Environment	7
The Cultural Context	10
IV. Excavation Summary	13
V. Tijeras Pueblo Through Time	26
VI. Preliminary Conclusions	37
VII. Reference	39
VIII. Appendices	44
Appendix A - Tree-Ring Dates, 1974 Season	45
Appendix B - Skeletal Remains from 1975 Excavations	50
Appendix C - Teaching Assistant Report 1975 Season by Gregory C. Burtchard	80
Appendix D - Teaching Assistant Report 1975 Season by Brona G. Simon	100

~~RECORDED~~

1961

1961 - 1962 - 1963 - 1964 - 1965

1966 - 1967 - 1968 - 1969 - 1970

1971 - 1972 - 1973 - 1974

1975 - 1976 - 1977 - 1978

1979 - 1980 - 1981 - 1982

1983 - 1984 - 1985 - 1986

1987 - 1988 - 1989 - 1990

1991 - 1992 - 1993 - 1994

1995 - 1996 - 1997 - 1998

1999 - 2000 - 2001 - 2002

2003 - 2004 - 2005 - 2006

2007 - 2008 - 2009 - 2010

2012 - 2013 - 2014 - 2015

2017 - 2018 - 2019 - 2020

2022 - 2023 - 2024 - 2025

2027 - 2028 - 2029 - 2030

2033 - 2034 - 2035 - 2036

2039 - 2040 - 2041 - 2042

2045 - 2046 - 2047 - 2048

2051 - 2052 - 2053 - 2054

2057 - 2058 - 2059 - 2060

2063 - 2064 - 2065 - 2066

List of Figures

1. Histograms of Absolute Counts of Trash Deposits



### List of Tables

1. Plants Identified in the Vicinity of Tijeras Pueblo
2. Room Constructed on Culturally Sterile Ground or Bedrock
3. Early Tree-Ring Dated Rooms
4. Summary of Major Skeletal Characteristics
5. Room Summary
6. 100S/030E Trash Profile
7. CHI-Square Results
8. Cultural Material by Level
9. Trash Profile Grid 20N/0W
10. Grid 20N/0W CHI-Square Initial Collapse
11. Grid 20N/0W CHI-Square Second Collapse
12. Trash Profile Grid 170N/130W
13. Grid 170N/130W CHI-Square Initial Collapse
14. Trash Profile Room 108, T3
15. Trash Profile Room 108
16. Miscellaneous Ceramic Frequencies



List of Maps

- 1a. LA-581 Tijeras Pueblo U.N.M. Excavations
- 1b. LA-581 Tijeras Pueblo U.N.M. Excavations to 1975
2. LA-581 Tijeras Pueblo 1975 Excavations
- 2a. LA-581 Tijeras Pueblo 1975 Excavations
3. LA-581 Tijeras Pueblo 1975 South Trench Complex
4. LA-581 Tijeras Pueblo 1975 North Trench Complex



### Acknowledgements

The students who participated in the 1975 field school at Tijeras Pueblo provided much of the information contained in this report, and I am grateful to them. The field school and survey staff members, Byron Blevins, Gregory Burtchard, Charles Carroll, Carol Joiner, R. Renee Richardson, and Brona Simon, deserve high commendation for their work and my unreserved thanks. Walter Atwood, in addition to working on the expanded survey, served as underpaid computer consultant and again did a fine job.

Laboratory analysis of the Tijeras Pueblo fauna has been carried out during the 1975-76 academic year by Lynn Cunningham with the assistance of Jill McGowan. Their work has been invaluable. Julia Dougherty and Jane Gulko have contributed to the analysis of the ceramics and room data respectively, and I appreciate their work.

Thomas Merlin of the New Mexico State Planning Office greatly facilitated the operation of the survey, and I appreciate his continued interest and understanding. The activities of the Laboratory of Anthropology of the Museum of New Mexico in connection with highway construction along Interstate 40 provided the opportunity for much fruitful discussion. I am especially grateful to Dr. Stewart Peckham, Dana Anderson, David Kaiser and Randy Morrison for their interest and helpful comments.

It has been, and continues to be, a pleasure to work with members of the U.S. Forest Service. Dean Berkey and John Hayden at the Sandia Ranger Station, Cibola National Forest, have been consistently generous and helpful. Dee Green and Landon Smith of the Southwestern Regional Office have been fine colleagues in every sense. Dr. Green's help in the preparation of this report has again been inestimable.



## I. Introduction

Two reports of the University of New Mexico field school at Tijeras Pueblo, L.A. 581, have been published in this series (Judge 1974, Cordell 1975). Of these, Judge's, which is the first published account of the field school's work at the site, is the more inclusive. My report was intended to be supplemental to Judge's statement, primarily in providing the results of the 1974 season. This report is intended to be an expanded account rather than another supplement. It should stand as an adequate, though not final, introduction to the archeology of Tijeras Pueblo in the context of known local prehistory. The major consideration in providing a fuller treatment at this time is that recently completed archeological work in the vicinity of Tijeras Pueblo and new data obtained at the site itself have provided meaningful background for interpretation of the site. The University of New Mexico field school, with the additional support of a grant from the New Mexico State Planning Office (Project Number 35-75-00047.2) completed a survey of 25 sections of the South Sandia--Tijeras Canyon area. Although the detailed survey report is separate (Blevins and Joiner n. d.), some of the results of the survey are incorporated here.

This report then contains discussion of the following: research orientation and methods, the environmental and cultural context of Tijeras Pueblo, excavation summary, the growth of Tijeras Pueblo through time, and preliminary conclusions.

## II. Research Orientation and Methods

Despite the impressive amount of research in northern Rio Grande prehistory which has been accomplished over the last 60 years, there are still innumerable problems to be addressed. Among these are explaining population fluctuations through time, explaining changes in site distribution through time, tracing the origins of specific items or traits and correlating the archeological remains with the various modern pueblo communities and language groups. Some of these problems are of a more general nature than others. Attempting to explain changes in the distribution of sites through time is a major concern of archeology in general and is not limited to the northern Rio Grande or the Southwest. The origins of specific items (e.g., square kivas or glaze paint) would seem to be significant primarily in the context of Southwestern prehistory. No matter which problem, or set of problems, one focuses on, I believe that it is imperative that the

investigator make the research interest explicit. Only in this way are the methods of observation and the data themselves meaningful.

Our concern at Tijeras Pueblo has been with investigating the relationship between resource availability and population fluctuations (cf. Judge 1974: 21-24). We have been examining the proposition that given abundant resources, population, both at the site and in the region, will continue to grow and that given a decrease in resources, population size will decline. The specific resources with which I am most concerned are water for domestic and agricultural use, wood for fuel and building material, and food including both wild foods and cultigens. It is expected that resource depletion may be the result of cultural (e.g., over-exploitation) and/or non-cultural (e.g., climate change) factors and that an attempt should be made to monitor these major determinants independently.

One of our first tasks is to explicitly state how we would expect resource depletion to be reflected in data available to the archeologist. The nature of the field school project permits expectations which involve information obtained through both survey and excavation. Expectations with respect to each of the resources noted are informally stated below.

#### Water

In the Southwest, water is a critical resource both for domestic use and for crops. If supplies of water for domestic purposes became critical, we might expect to find habitation sites located near perennial water sources almost exclusively and that this would be the case even if distance to other important resources (e.g., prime agricultural land) were increased. We might also expect labor intensive activities which would increase facilities for domestic water sources. Such facilities might include reservoirs and/or an abundance of or increase in size of ollas. If water for agriculture constituted a problem, there might be a shift in location of sites to those topographic situations which preserve the moisture content of the soil. These would include slightly higher elevations and exposures which receive relatively little direct sun. The water retention characteristics of the soil itself would be important in determining site location. It is anticipated that if labor intensive agricultural features are appropriate for increasing water for agriculture, these would be constructed. Such devices might include check dams, irrigation canals, contour

terraces and gravel-mulched bordered gardens (Vivian 1974:100). Site location might reflect a shift to situations where the catchment area is increased and where the labor intensive features can be most effectively utilized. (It is necessary to have some gradient in order to use an irrigation ditch.) Finally, it is expected that a decrease in water supply is most likely to be the result of climate change, and this is most effectively monitored locally through the use of dendroclimatological information (Cordell 1975).

### Wood

Supplies of wood may be diminished through natural agencies (forest fires) or through cultural practices such as clearing agricultural land or overcutting timber for building material or for firewood. The location of Tijeras Pueblo, and the survey area, in the shadow of both the Sandia and Manzano Mountains does make diminished supplies of timber difficult to imagine; however, if it were a problem, it should be amenable to detection. It might be expected that pollen spectra would show a consistent decline in arboreal pollen, not just at Tijeras Pueblo which would be anticipated in any case due to agricultural and building activities, but in samples taken from higher elevations in the surrounding mountains. At the site of Tijeras Pueblo itself, one might expect to find greater re-use of beams in room construction and, perhaps, greater frequency of carbonized corn-husks or other poor quality fuel.

### Food

Resource depletion with respect to subsistence items must include consideration of both plant foods and game. In the context of an agricultural society, climate changes which would reduce the yields of crops are critical. In the Tijeras Canyon area, I would anticipate that cool intervals with shortened growing seasons might have been a more frequent problem than periods of deficient precipitation. In either case, dendroclimatological reconstruction, palynology and studies of invertebrate fauna should permit some control over climate fluctuations which might have been significant for crops. In addition, declines in agricultural yields should be reflected in quantitative and qualitative changes in the crops themselves. There should also be both greater frequency and greater variety in buffering resources, particularly wild plant foods, and these might include items found at a greater distance from the community. Thus, we might expect to find an increase in the

number of limited activity sites (plant gathering and plant processing stations) at distances further from Tijeras Pueblo. If crops were not sufficient to provide stored food throughout the winter, one might also expect to find a shift to year-round hunting and to the taking of game which was not in prime condition. There might also be an increase in game animals which are technologically difficult to obtain.

With shortages of agricultural produce, there might be both increased amounts of trade and shifts in trade networks. Trade relationships provide one mechanism for obtaining both information about resources available in other regions and subsistence goods themselves. Such relationships may also be exploited if a move from one region to another becomes necessary (cf. Waddel 1975). An expected increase in trade might be reflected in greater amounts of imported ceramics. (Imported culinary ware might be significant.) One might also expect trade, and communication, networks to shift to those regions which could be shown to have been better off during the period of stress.

Site aggregation may also be viewed as a response to declining agricultural yields. Aggregation permits an increase in the number of people participating in both production and consumption. If buffering resources become important, a larger work force increases the chance of success in bringing in subsistence items, and an aggregated population facilitates the distribution of such items once obtained. Further, if labor intensification is an appropriate solution to increasing agricultural yields, aggregation is an effective strategy. Finally, aggregation facilitates information exchange which may be critical to organizing search efforts for buffering resources (Burtchard and Cattle n. d.).

It is now fairly well recognized that despite the fact that the Anasazi were agriculturalists, game played an important part in their economy and is still important among their descendants (Ortiz 1969). It is possible that with diminished crops of cultigens, hunting may have increased to the extent of locally depleting game. It is also possible that over-hunting may have occurred in the absence of failing agriculture. If either were the case, there might be an overall decrease in the amount of game taken through time. It is also expected that the larger game animals, those with slower recovery time, would decrease first. One might find increasingly greater variety in small game and perhaps greater utilization of game not available in the immediate area. Given the relatively uniform

distribution of game animals in the Southwest (deer, antelope, and rabbits are ubiquitous), it would be difficult to monitor the importation of game. On the other hand, increasing amounts of bison bones at Tijeras Pueblo would indicate such a pattern.

There are also some general considerations which would relate to depletion of subsistence resources. It would be expected that the skeletal population of a community experiencing dietary stress would reflect pathologies related to malnutrition. Further, assuming that warfare is largely the result of economic motives, resource depletion might be accompanied by evidence of inter-group hostility. Archeologically this might be noted in a shift of sites to readily defensible locations and within a site, to evidence of violence and destruction. Finally, I would anticipate that in the absence of resource depletion, communities should reflect rather gradual population increase and perhaps budding off of groups to found new settlements. This should be observable architecturally in the gradual addition of rooms and room blocks at a site and also by considerable remodeling. I would expect that evidence of large-scale population changes, site abandonments and/or evidence of rapid population aggregation might indicate resource stress.

### Methods

The methods used in our research follow from the stated problem orientation. As Judge (1974:22) has stated, it is essential that the population dynamics at Tijeras Pueblo be monitored independently of fluctuations in resources. Population dynamics at the site have been examined primarily through architectural changes and dated through both the use of tree-rings and, to a more limited extent, ceramic frequencies. Attention to room function has been given through functional classification of artifacts, as well as to observations of room size, orientation, and floor features. Monitoring resources has initially required taking extensive samples of trash deposits, recovering all faunal material, floating 20% of the trash deposits, taking soil and pollen samples from trash, and taking soil and pollen samples from room floors and features. Chronological control of the trash samples is obtained through changing ceramic frequencies which are independent of resources. Observation of stratigraphic events, both erosional and depositional, are, of course, being made. These should reflect periods of disuse and use of various parts of the site respectively. For a discussion of the grid system, excavation, recording and analytic techniques, the interested reader is referred to Judge (1974:25-31).

The methods used in the site survey have also reflected an attempt to monitor population dynamics independently of resource fluctuations, although both are more difficult to explore through survey data. Chronology has been determined entirely through ceramic frequencies. The size of individual sites and the density of sites in the survey area through time are being used to evaluate population dynamics. Attention to functional differences in sites is considered most important in this respect, and some control is being developed through functional classification of artifacts and noting the presence or absence of architectural features. Artifact categories in combination with environmental observations are being used to monitor the possible resource use patterns of sites known only from survey (see Blevins 1975 and Blevins and Joiner n.d. for detailed discussion).

### Significance

The research orientation at Tijeras Pueblo does have relevance to current theoretical issues in archeology and anthropology. In archeology and anthropology, there is an increasing concern with trying to explain cultural variability by viewing culture primarily as a means of adaptation to both cultural and non-cultural environmental variables (e.g., Binford 1972, Cohen 1974, Redman 1973, Steward 1955, White 1959). Cultural change, particularly structural or evolutionary change, is seen as a response to conditions of stress, usually related to population increase and variability in the natural environment (Binford 1968, Glassow 1972, Martin and Plog 1973). If such explanations of change are to be meaningful, they must also enable us to specify those conditions under which evolutionary change will not take place as well as those under which they will. At least part of the problem would then be first to determine whether or not environmental and/or population stress is present in a given situation; and second, if such stress is found to exist, to define the range of appropriate adaptive responses which would alleviate the stress. It would then become possible to attempt to specify, for any given situation, the conditions under which structural change would be a more probable alternative than modifications which do not entail higher orders of system complexity. Archeological research in the Southwest would seem to be well suited to contributing to our understanding in this regard. Sedentism and agriculture, which provide the basis for population stress, appear relatively early in the archeological sequence. Variability in conditions in the natural environment, particularly rainfall, is

well documented, and labor intensive strategies were utilized (Vivian 1974). Yet, cultural evolution does not seem to have gone beyond the level of egalitarian, or in some cases possibly ranked, societies.

In summary, the research orientation at Tijeras Pueblo is directed toward first determining whether or not resource depletion, which certainly entails stress, was occurring at the site and in the local area. Secondly, if resource depletion is shown to have been a problem, its effect on the population can be monitored and models of alternative solutions developed and tested.

### III. The Environmental and Cultural Context of Tijeras Pueblo

#### The Natural Environment

Tijeras Pueblo is located about 15 miles east of Albuquerque, New Mexico, on the grounds of the Sandia Ranger Station, Cibola National Forest. The site is at an elevation of 6,200 feet, but the local setting is mountainous. The Sandia Mountains west of the site rise to an elevation of 10,675 feet. Cedro Peak, in the Manzano Mountains east of the site, is 7,767 feet high. Tijeras Canyon provides a major pass through the Sandia and Manzano Mountains and thus links the Rio Grande Valley with the Estancia Basin. The survey area included a considerable portion of Tijeras Canyon itself as well as several side canyons, or portions thereof. From west to east, the side canyons included are Corral, Apachitos, Hondo, Chamisoso, Primera Agua, and Guitierrez Canyons. Perennial water sources in the survey area today are the main wash of Tijeras Canyon, Carlito Spring and the wash fed by Carlito Spring, the wash just east of Hobbies, the spring and wash west of Hobbies, Seven Springs, and the seep immediately northwest of the main mound at Tijeras Pueblo.

Geologically, Tijeras Pueblo is situated at a transition zone between the Permian Abo Formation sandstone and Pennsylvanian Madera limestone (Kelly 1963, Loose 1974). The site itself was constructed on a limestone outcrop. Alluvium, up to several feet in thickness, is present along the main wash of Tijeras Canyon. Madera limestone underlies most of the survey area with Abo sandstone, the Cretaceous Mesa Verde sandstone and shale, and Cretaceous Mancos shales to the west in the Sandia Mountains (Kelly 1963). Tijeras

Pueblo is located on soils of the Carlito-Stony land complex with alluvial land soils in flat areas along the main wash of Tijeras Canyon. Immediately north and south of the site, soils of the Tablezon-Stony land complex predominate. Both stony land complexes consist of deep, clayey and stony soils with ph values between 7.4 and 8.0. They are subject to severe erosion by water and are considered poor for use as topsoil. The alluvial soil is of variable texture, considered poor for topsoil and is moderately subject to flooding (U.S. Dept. of Agriculture 1974, The Middle Rio Grande Council of Governments of New Mexico 1974).

The climate in Tijeras Canyon is slightly cooler and more moist than that in Albuquerque. Mean annual temperature over a 30-year period in the canyon was  $49.1^{\circ}$  (Lambert 1954:3) compared to  $55.8^{\circ}$  in Albuquerque. Annual precipitation is 14.24 inches in the canyon compared to 8.28 inches in Albuquerque (U.S. Dept. of Commerce 1973). The 1974 records from the Sandia Ranger Station indicate that most precipitation occurs in winter, and that April, May and June are virtually without rain. Summer storms begin about mid-July. Maximum January temperatures for 1974 averaged  $48.4^{\circ}$ . Minimum temperatures for the same month averaged  $13.29^{\circ}$ . Maximum June and July temperatures for 1974 averaged  $88.16^{\circ}$  and  $80.62^{\circ}$  respectively. Minimum temperatures for these months averaged  $47.06^{\circ}$  and  $45.3^{\circ}$  respectively. Frosts have occurred as late as the third week in May and as early as mid-September (U.S. Forest Service 1974).

As with any mountainous area, vegetation varies considerably and may be related to elevation, exposure, slope and available water. Tijeras Pueblo is situated in the Upper Sonoran life zone, but there is access to the Transition, Canadian and Hudsonian zones in the nearby mountains. Vegetation in the immediate vicinity of the site reflects disturbance caused by road building and recent erosion. Tumbleweed (Salsola kali) and summer cypress (Kochia sp.) are fairly abundant and are good indices of disturbance (Cully n. d.). Table 1 provides a list of plants identified in the immediate area of Tijeras Pueblo by Ann Cully, a University of New Mexico biology student. Most of the identifications were made in a transect through a small canyon which included a north facing rocky slope, finer grained and sandy soils of the canyon bottom, and a rocky south facing slope.

Table 1  
Plants Identified in the Vicinity of Tijeras Pueblo

* <u>Pinus edulis</u>	pinon pine
* <u>Juniperus scopulorum</u>	Rocky Mountain juniper
* <u>Juniperus monosperma</u>	one seeded juniper
<u>Agropyron</u> sp.	wheat grass
* <u>Bouteloua gracilis</u>	blue grama
<u>Bouteloua curtipendula</u>	side oats grama
<u>Polypogon monspeliensis</u>	rabbit foot grass
* <u>Stipa comata</u>	needle and thread grass
<u>Poa</u> sp.	blue grass
<u>Cyperus esculentus</u>	
* <u>Yucca bacata</u>	yucca
* <u>Yucca angustissima</u>	narrow leaf yucca
<u>Populus</u> sp.	cottonwood
* <u>Quercus grisea</u>	gray oak
<u>Atriplex canescens</u>	four wing salt bush
* <u>Eurotia lanata</u>	winter fat
<u>Salsola kali</u>	tumbleweed
* <u>Kochia</u> sp.	summer cypress
* <u>Lesquerella</u> sp.	bladerpod
* <u>Lepidium</u> sp..	
* <u>Cercocarpus montanus</u>	mountain mohagony
<u>Petalostemum canidum</u>	prairie clover
<u>Psorlea</u> sp.	scurf pea
<u>Melilotus</u> sp.	sweet clover
<u>Croton texensis</u>	dove weed
* <u>Opuntia</u> sp.	prickly pear
* <u>Mammillaria</u> sp.	pincushion cactus
<u>Asclepias speciosa</u>	milkweed
<u>Verbena pinnatifida</u>	verbena
<u>Cucurbita foetidissima</u>	stinking gourd
<u>Cirsium</u> sp.	thistle
* <u>Chrysanthemus nauseosus</u>	rabbit bush
* <u>Ratibida tagetes</u>	prairie cone flower
* <u>Gutierrezia</u> sp.	snakeweed

\*Plant observed or collected within the transect.

In summary then, Tijeras Pueblo occupies a position that would seem to have been quite favorable for prehistoric agriculturalists. The site is close to relatively good alluvial soils. The seep provides a source of water at the site, and water is relatively abundant in the canyon itself. Numerous rock outcrops provide sources of building material. A diversity of plant and animal species were available in the foothills and mountains near the site, and access to the resources of both the Rio Grande Valley and the Estancia Basin would have been possible. In view of the relatively cool and moist conditions in the canyon, compared to locations both east and west of the mountains, it would seem likely that fluctuations in the growing season might have been more of a detriment to crops than a lack of water.

#### The Cultural Context

Following the cultural sequence outlined by Wendorf and Reed (1955), prehistoric development in the northern Rio Grande may be divided into five chronological periods: Preceramic, Developmental, Coalition, Classic and Historic. The Preceramic Period (ca. 15,000 B.C. - A.D. 600) has been documented by the work of Hibben (1941), Judge (1973), Judge and Dawson (1972), and others. Our survey did not add any information to this. Survey crews recovered a single Folsom point base, out of context, in a wall at a site containing late glaze ceramics. No other Paleo Indian or archaic materials were located by UNM survey crews. This should not necessarily be interpreted as indicating that the canyon was not utilized by preceramic cultures. Private collectors have recovered Paleo Indian and archaic (particularly Jay phase) (Irwin-Williams 1973) material in the canyon area. Inquiries regarding the provenience of these finds might at some time be made but was beyond the scope of the information we wished to obtain at present. In addition, in his survey of the right-of-way of proposed road construction along Interstate 40, D.H. Snow (1972) located a chipping station (L.A. 10793) which may contain archaic materials. This site, reexamined by our survey personnel, also contained ceramics. Possibly, it is a mixed deposit.

The Rio Grande Developmental Period (A.D. 600 to 1200) as described by Wendorf and Reed (1955), embraces a considerable amount of diversity. Early in the period, rare, small pithouse villages are noted. Later in the Developmental Period, particularly after A.D. 900, villages become larger and more numerous. Sites consisting of 10- to 20-room surface structures and from 1 to 4 kivas are reported. A "Great Kiva" from this time period is reported from

L.A. 835, 15 miles north of Santa Fe (Stubbs 1954 quoted in Wendorf and Reed 1955). Wendorf and Reed (1955) see some affiliation with the San Juan at this period, particularly in the presence of mineral paint wares considered locally produced "cognates" of Chacoan ceramics, but the northern Rio Grande is also viewed as marginal to the San Juan at this time. Twenty-two sites located by UNM survey crews have been assigned to this time period. The greatest concentration of these are at relatively low elevations (below 6,400 feet), and on or adjacent to alluvial land. None of these sites is particularly large and some undoubtedly represent seasonal rather than year-round habitation. The proximity of these sites to alluvial land would seem to indicate the importance of agriculture, though excavation is needed to clarify this.

The Coalition Period (A.D. 1200 - 1325) is characterized first by a shift from mineral to carbon paint in most of the northern Rio Grande area and by the retention of subterranean, round kivas. At about A.D. 1300, there was a pronounced increase in population, increased regional differentiation, the appearance of above-ground kivas incorporated into room blocks, and the production of Galisteo Black-on-white, which resembles late Mesa Verde Black-on-white (Wendorf and Reed 1955:145). Mera (1935), Reed (1949) and Wendorf and Reed (1955:161) view the introduction of Galisteo Black-on-white as representing an actual migration into the northern Rio Grande area of people from the Mesa Verde region. In the area surveyed by the UNM crews, there is a doubling of the number of sites during the Coalition Period, but this increase appears to occur slightly before A.D. 1300 and is not accounted for by sites containing Galisteo Black-on-white ceramics. Rather, the increase is tentatively associated with sites containing Santa Fe Black-on-white, Pindi Black-on-white, and Poge Black-on-white types. Coalition Period sites in the survey area occur over a wider area and are more dispersed with respect to elevation than those of the previous period, but these sites are still relatively small and still situated on or adjacent to alluvial land. Construction of Tijeras Pueblo began late in the Coalition Period, and the site may have attained its maximum size during Coalition times. There is, however, no discontinuity in building at Tijeras Pueblo between the Coalition Period and the succeeding Rio Grande Classic.

The Rio Grande Classic (A.D. 1325 - 1600) is characterized by the use of red-slipped glaze decorated ceramics in the northern Rio Grande. Glazeware was presumably made in imitation of the Zuni and Little Colorado area ceramics where the use of glaze preceded

its appearance in the Rio Grande. That the appearance of glaze decorated ceramics represented a migration from the west was proposed by Shepard (1942:197-99) and Reed (1949:69-70). Mera (1935) and Wendorf and Reed (1955:150, 161), however, view the introduction of glaze in the northern Rio Grande as having primarily resulted from diffusion, perhaps accompanied by movement of a small number of people. The Rio Grande Classic is characterized as a period of "cultural expansion and florescence" (Wendorf and Reed 1955:153). Population in the northern Rio Grande reached its prehistoric maximum. Large, aggregated communities were present, and there was elaboration of material culture. Wendorf and Reed (1955:153) list decorated pipes, elaborate axes, carved bone tools, stone effigies, mural paintings and variety in vessel forms as characteristic. Aggregation of settlements, which may have begun late in the Coalition Period, is marked in the Classic. Large settlements at Tijeras Pueblo, Arroyo Hondo (Schwartz and Lang 1972), Kuaua (Tichy 1938), Te'ewi (Wendorf 1953), Tyounyi (Hendron 1940), Pecos (Kidder 1932), and San Antonio (R. Morrison, personal communication, 1975) are documented. The Classic was also a period of population fluctuation. Tijeras Pueblo and Arroyo Hondo (Schwartz 1972) were both abandoned early during the Classic. Sites on both the Pajarito Plateau and in the Chama Valley were abandoned late in the Classic (Wendorf and Reed 1955:153). Both warfare and a drought between 1560 and 1585 have been suggested as possible motives for abandonment (Wendorf and Reed 1955:153). Since Tijeras Pueblo seems to have been abandoned early in the 15th century, this particular drought cannot be invoked as an explanation for its desertion. In the survey area, the number of sites attributed to the Classic Period is about the same as it had been in the previous period, but these are now confined to a few fairly large aggregated settlements with numerous associated limited activity areas (chipping stations, hunting camps and, perhaps, seed and nut gathering locations). The aggregated settlements are situated near perennial water sources. Tijeras Pueblo and San Antonio (L. A. 24) are the most prominent settlements in the survey area at this time. Toward the middle of the Classic Period, at about A.D. 1450, there is a marked decrease in the number of sites in the survey area, and those sites that continue to be occupied are at somewhat higher elevations (up to 7,000 feet).

The Historic Period in the northern Rio Grande (A.D. 1600 to present) is known primarily from sites abandoned at about the time of the Pueblo Revolt (1680-1692) and from the excavations

at Pecos (see Wendorf and Reed 1955:154 for a list of sites). Paa-ko (Lambert 1951) is still the best documented site of this time period in the vicinity of the survey area, though important information will also be derived from analysis of the material the Laboratory of Anthropology of the Museum of New Mexico has excavated at San Antonio. In the survey area, historic period sites do not attain the number of those recorded for the Coalition Period, and there is a decrease in the number of sites through time. Many of the recorded sites would seem to be limited activity areas rather than villages, and these are widely distributed with respect to elevation and topographic features. Tijeras Pueblo was, of course, a ruin in historic times.

In summary then, Tijeras Pueblo was constructed after 400 years of well documented prehistoric occupation of Tijeras Canyon. The site probably attained its maximum size during a period of general site aggregation in the vicinity. Within the context of the northern Rio Grande area as a whole, this may have been a time of marked population increase. Tijeras Pueblo was abandoned early in the Classic Period which seems to have been a time of considerable general population fluctuation in the survey area as well as in the entire northern Rio Grande region.

#### IV. Excavation Summary

A discussion of the history of professional archeological work in the Tijeras Canyon is included in the final survey report (Blevins and Joiner n. d.). This section is limited to a brief description of work carried out at Tijeras Pueblo from the early 1930's through 1974 and a fuller account of the work of the 1975 field season. A more detailed summary of the work from the 1930's through 1973 may be found in Judge's report (1974), and Cordell (1975) should be consulted for an expanded treatment of the 1974 excavation.

H. P. Mera drew a sketch map of L.A. 581 in the early 1930's and made a surface collection of ceramics. In his 1940 summary of Rio Grande prehistory, he noted that Glaze A ceramics predominated at the site, and he included it in his Tano-Towa division. In 1931 and 1933, W. S. Stallings collected tree-ring samples from Tijeras Pueblo for the Laboratory of Anthropology, Santa Fe. Twenty-seven of these samples were dated by the Laboratory of Tree-Ring Research, University of Arizona, and published (Robinson et al. 1972:31-32). Unfortunately no map showing the provenience of the

samples taken is available. Of the dates obtained, 16 are cutting dates. These range from A.D. 1345 to 1393. Of these 16 dates, six are 1387 and seven are 1393. The latter correspond well with dates we have since obtained for final construction in the main mound.

In 1948, excavation at Tijeras Pueblo was carried out by the UNM field school. That year the field school crews worked both at L.A. 581 and L.A. 586 (the Tijeras Canyon site, 3/4 mile north of Tijeras Pueblo). Work at L.A. 581 was under the direction of Stanley Stubbs. Neither a map nor final report of the 1948 excavation at Tijeras Pueblo has been located, but 26 student notebooks are in the field school files. The exact provenience of the 1948 excavations is unknown; however, 9 rooms and a pithouse were excavated in the main mound. In 1968, Dr. Stewart Peckham, Laboratory of Anthropology, Santa Fe, excavated a 14-1/2 room outlier east of the main mound. The work was undertaken as a salvage project in connection with the construction of a warehouse by the Forest Service. All records and artifacts are at the Laboratory of Anthropology. In 1969, David Snow of the Laboratory of Anthropology, extensively trenched an outlier south of the main mound, in connection with proposed road construction which eventually avoided the site. Materials are in file at the Laboratory of Anthropology, Santa Fe.

In 1971, the University of New Mexico field school began extensive work at Tijeras Pueblo. Dr. W. James Judge, Department of Anthropology, UNM, was field school director from 1971-1973. The 1971 excavation was exploratory in nature, designed to define room construction and periods of building. All of Room Block VI (Map 1b) which consisted of six rooms (4, 5, 11, 12, 13, and 18), was excavated. In the main mound, rooms were excavated in the southeast, central and northeast portions of the mound (rooms 1, 2, 3, 6, 7, 8, 9, 10, 14, 15, and 16). Not all of these were excavated to their deepest floors. In the fall of 1971, Larry Martin, a UNM student working under Dr. Judge's direction, excavated rooms 19, 20 and 21.

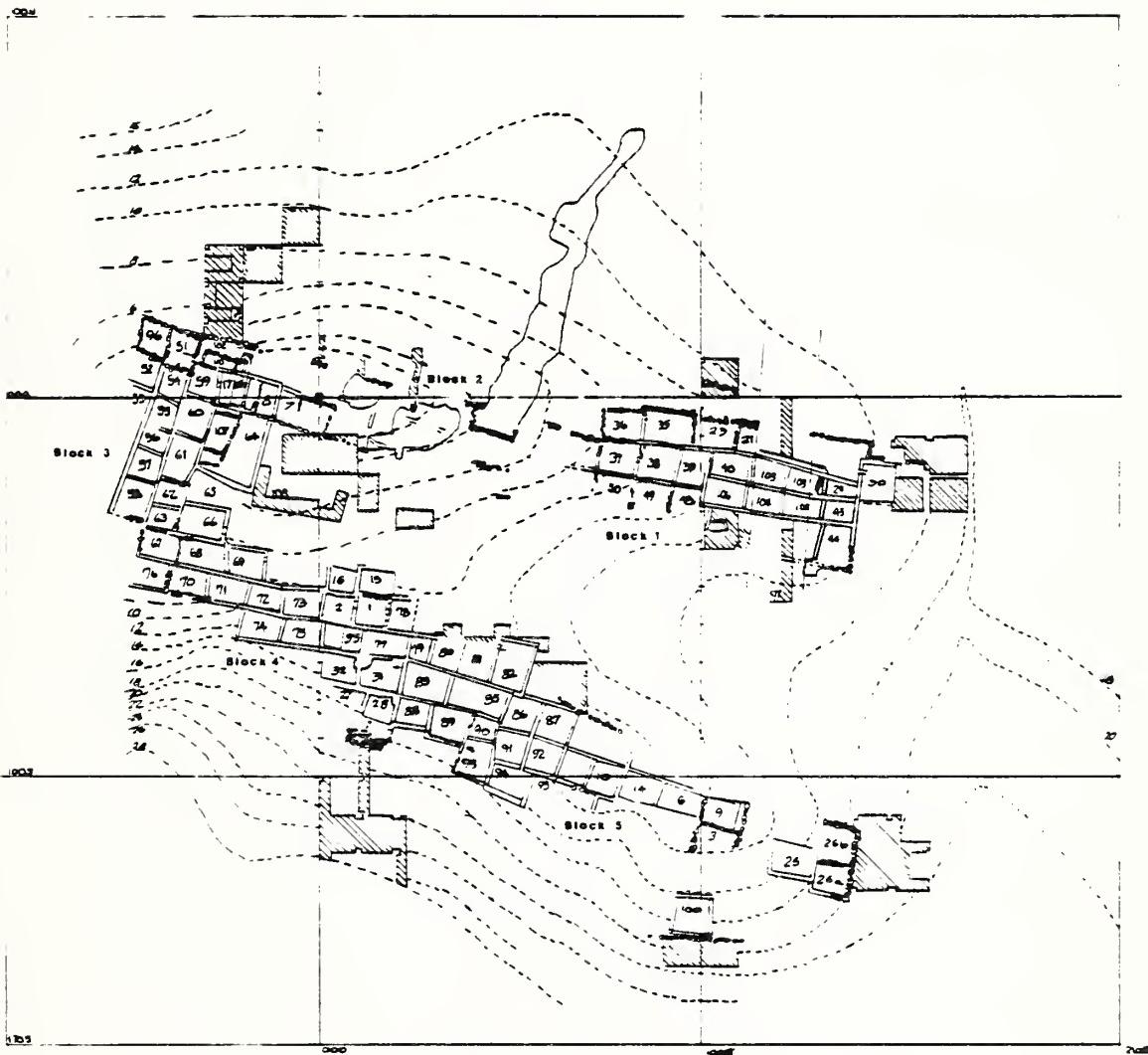
In 1972, field school excavation was limited to the main mound. Room 23 was excavated by staff prior to the beginning of the field season. The efforts of the summer's work were directed toward determining site stratigraphy. Extensive stratigraphic tests were made in the east, southeast and south perimeters of the main mound. Those rooms which were excavated were adjacent to these tests (rooms 24-34).

The 1973 excavation was directed toward obtaining an adequate sample of rooms in the main mound and excavating these to their first floor levels. Surface stripping was carried out in all but the southeast portion of the main mound, this area being deliberately left as an area the Forest Service might want to excavate and stabilize for public exhibit. The stripping operation permitted the definition of about 100 rooms in the main mound. These were grouped into room blocks and assigned excavation priority on the basis of random designation within room block. A total of 37 rooms were then excavated down at least to the level of their first floors. Stratigraphic testing was continued during the 1973 season in the area south of rooms 28 and 31 and northeast of room 51. Thus, at the end of the 1973 field season, 66 rooms had been excavated, at least to first floor level. Six of these were in Room Block VI, and the rest in the main mound.

The present writer assumed the duties of field school director in 1974 when Judge joined the Chaco Center of the National Park Service. The 1974 season was primarily directed toward obtaining a better idea of the size of Tijeras Pueblo at different periods and monitoring changes in the subsistence base through time. All work was again in the main mound. Test pits were excavated in 10 rooms which had previously been dug to their first floors in order to determine if lower floors were present. These were rooms 1, 55, 57, 60, 62, 66, 69, 79, 88 and 90, all in the west central and southwest areas of the main mound (Room Blocks III, IV, and V, see maps 1a and 1b). Room 64, which proved to be a kiva, was completely excavated. Rooms 107 and 109 were found to underly room 64. Similarly, room 110 was found underlying room 102. Testing of all these underlying rooms was done. In addition, excavation in the north-east area of the main mound (Room Block I) was done in order to establish the extent of underlying rooms. Rooms 42 and 47, which represent the later phase of building, were first excavated. Overburden was then removed mechanically and underlying rooms 29, 30 and 43 (which had been visible on the surface or partially excavated previously) and rooms 103, 104, 105 and 106 (exposed after removal of the overburden) were completely excavated. In addition, two large areas of trash deposits on the north side of the main mound were excavated to sterile ground (Cordell 1975).

The work of the 1975 season will here be given in detail since it has not been reported previously. The field school began on June 9 and lasted through July 24. Thirty-five students, from various colleges and universities, participated. Gregory Burtchard and Brona Simon





Map 1a

TUERAS PUEBLO ~ LA 501  
1978 EXCAVATIONS - MERRILL AND ADKINS

SCALE  
100'-0"  
100'-0"

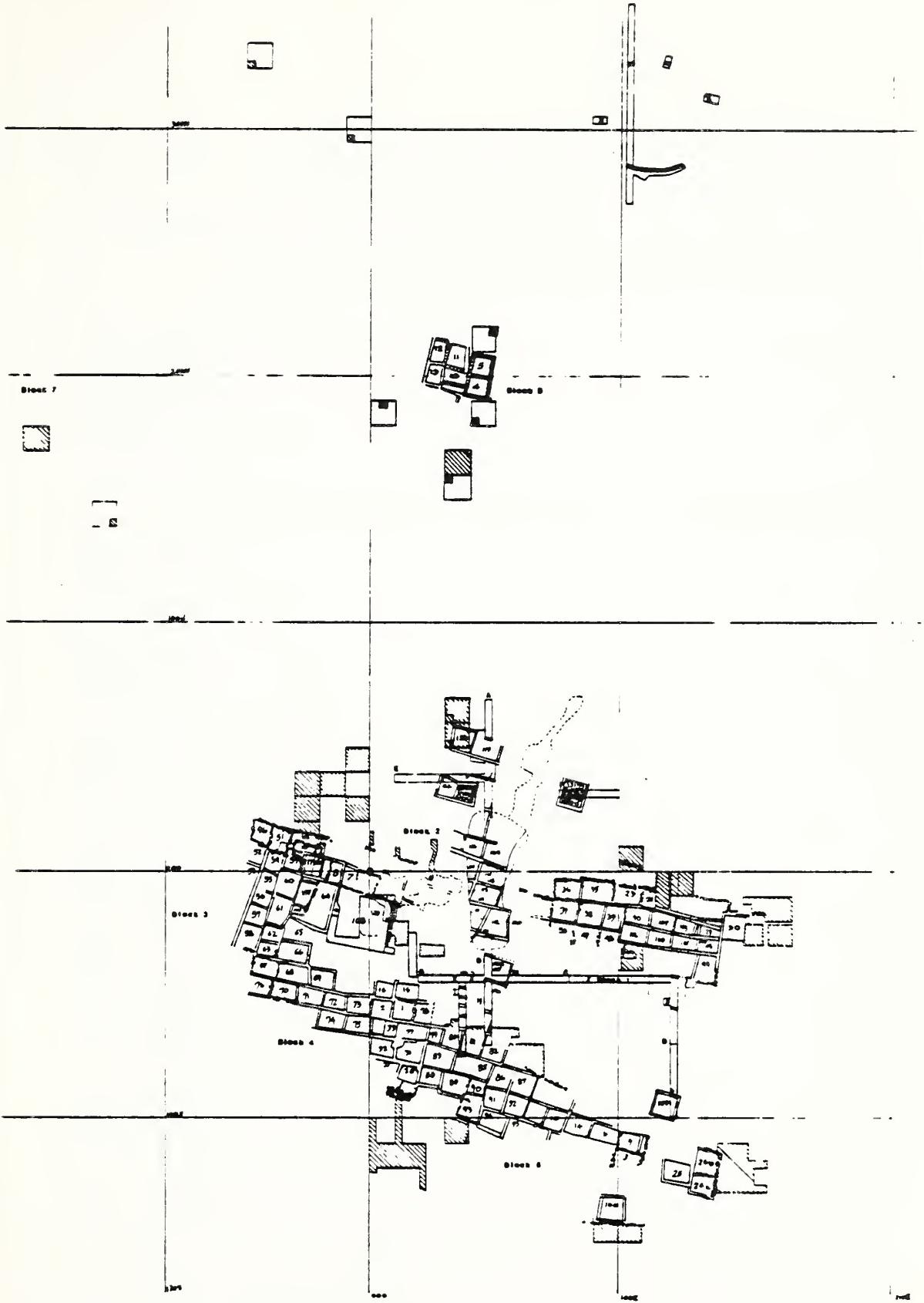
CONTOUR INTERVAL = 2 FEET

KEYS

- TEST EXCAVATIONS
- CONTOUR LINES
- + GRID CORNER MARKERS
- DATUM POINT
- AREAS OF PECHE DISTURBANCE
- EXCAVATIONS TO LA LEVEL ONLY

LA-501 TUERAS PUEBLO  
JUNIOR EXCAVATIONS  
SCALE 1"=20' A.F.





Map 1b

SCALE  
100M

KEY

- TEST CONNECTIONS TO STERILE
- TEST ZONE STERILE
- PRIME REFERENCE
- DATUM POINT

U-3B TANKS REBUILT  
UNH SEPARATORS AND  
DATA PTD C.C.

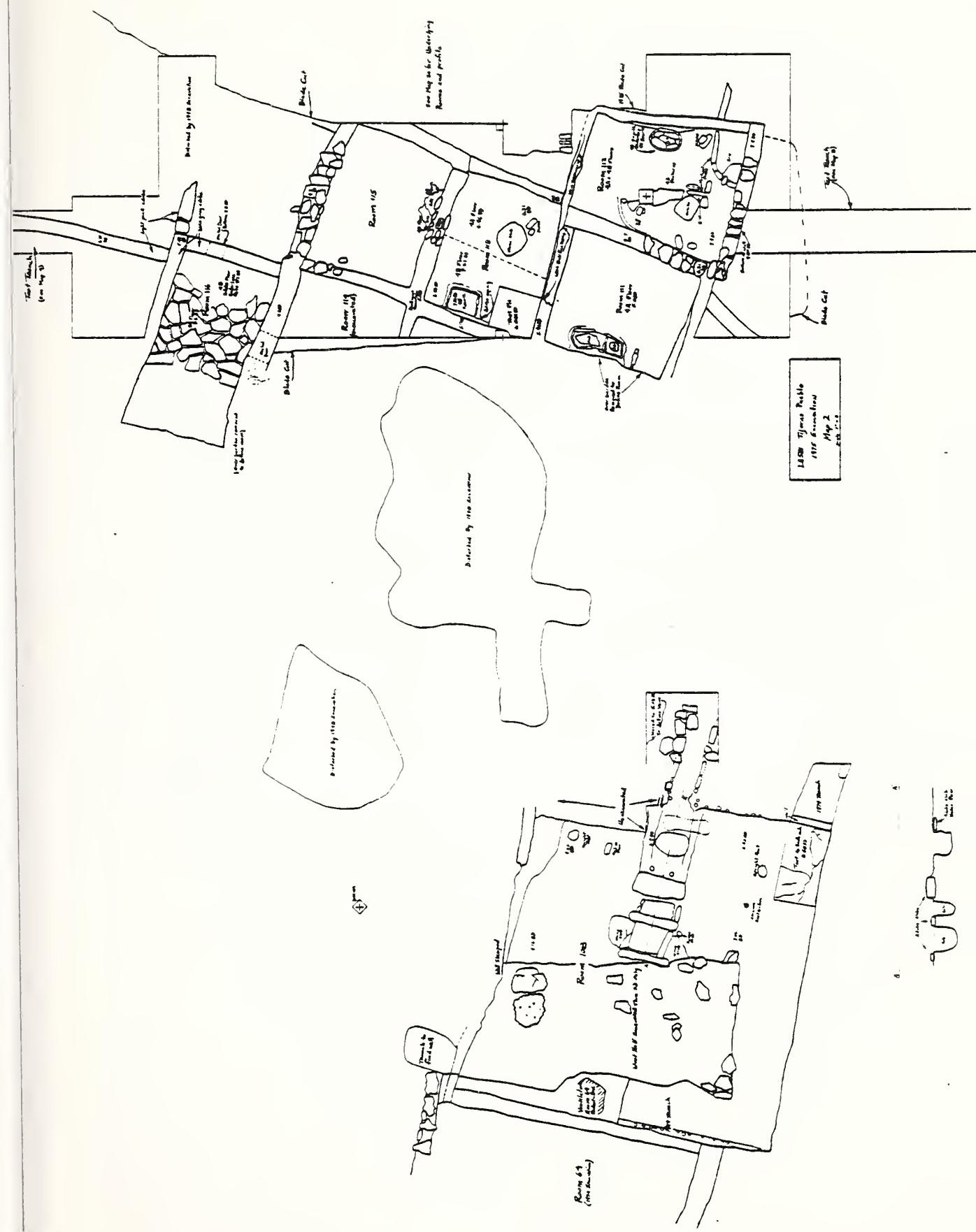


were teaching assistants on the site. Charles Carroll was both mapper and photographer. Byron Blevins again acted as teaching assistant responsible for the field school portion of the survey. R. Renee Richardson was the teaching assistant for the laboratory. The writer was field supervisor.

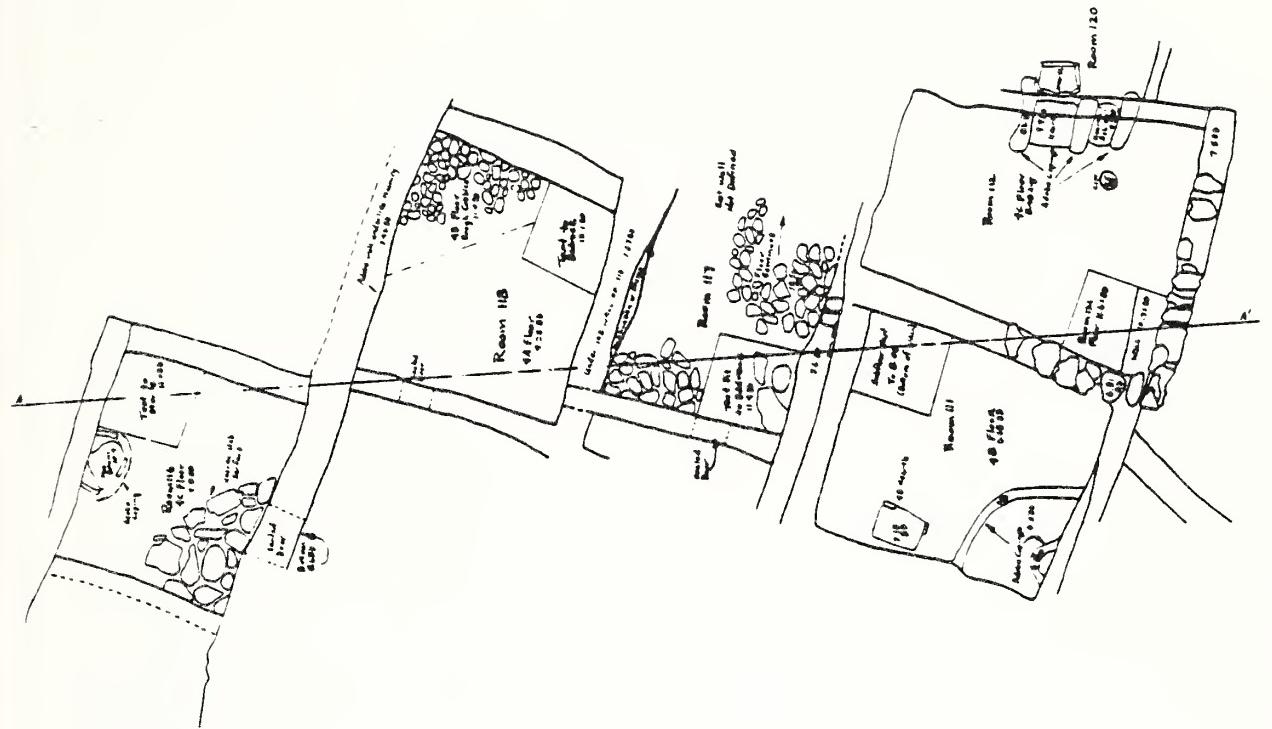
The major effort during the 1975 field season was again directed toward delimiting the size of Tijeras Pueblo during its earlier period and obtaining additional samples of trash in order to monitor both architecturally inferred periods of partial site disuse or abandonment and possible subsistence changes through time. Most of the work was confined to the main mound, but tests were also carried out in Room Block VII and Mera's mound I (maps 1a and 1b).

During the 1974 season, excavation in the northeast section of the main mound (Room Block I) had revealed a room cluster (rooms 29, 30, 43, 103, 104, 105 and 106, see above) underlying the final construction in that area of the site. In order to determine the extent of this earlier occupation, mechanical removal of overlying rooms again seemed desirable. It was decided that maximum information with the least destruction could be obtained by removing overburden in the north-central area of the main mound (Room Block II) which had been severely disturbed by the 1948 excavation. On May 26, prior to the beginning of the field season, a road grader was again borrowed from the Bernalillo County Highway Department. The grader cut a north-south trench 50 feet long and 15 feet wide between grid lines 040E and 055E and 030S and 020N. The grader cut was about .4 foot deep, just deep enough to expose the underlying walls of rooms designated 111, 112, 113, 114, 115, 116 and 120 (map 1b). Of these rooms, 111, 112, 113, 115 and 116 were completely excavated. Each of these rooms had multiple floors (see appendix C, this report). Excavation of these rooms revealed the underlying offset walls of rooms numbered 117 and 118. The floors of rooms 117 and 118 and the third and deepest floor of room 116 rested on culturally sterile ground (map 2a). In view of the extent of underlying construction, trenches were opened north and south of the grader cut. North of the blade cut, trench A revealed the walls drawn on map 1b and map 4 and rooms 119 and 122. Room 119, although badly eroded, was completely excavated. Sub-floor testing in rooms 119 and 122 indicated that they had been built on fairly shallow trash. Trenches B, C, D, G and H (map 1b and map 3), south of rooms 112 and 101 exposed further underlying walls which, judging by their depths and alignments, indicate that the lower level of rooms extended across much of what was later plaza area in the main mound.

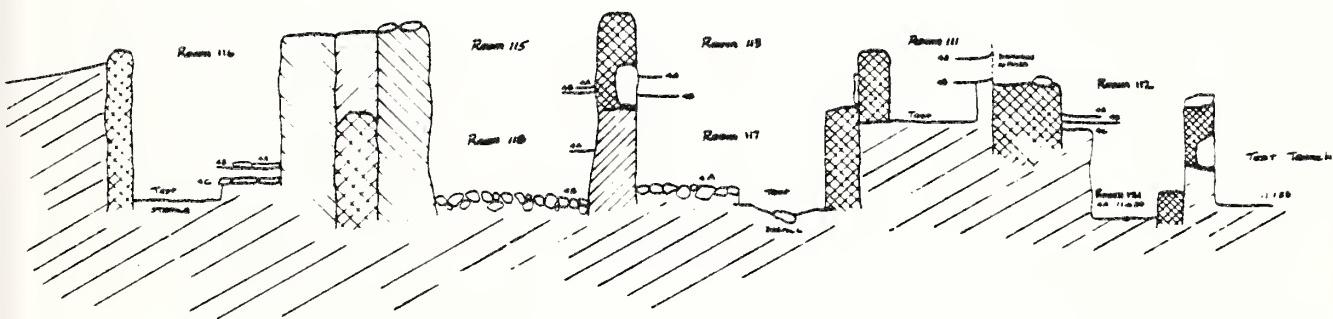




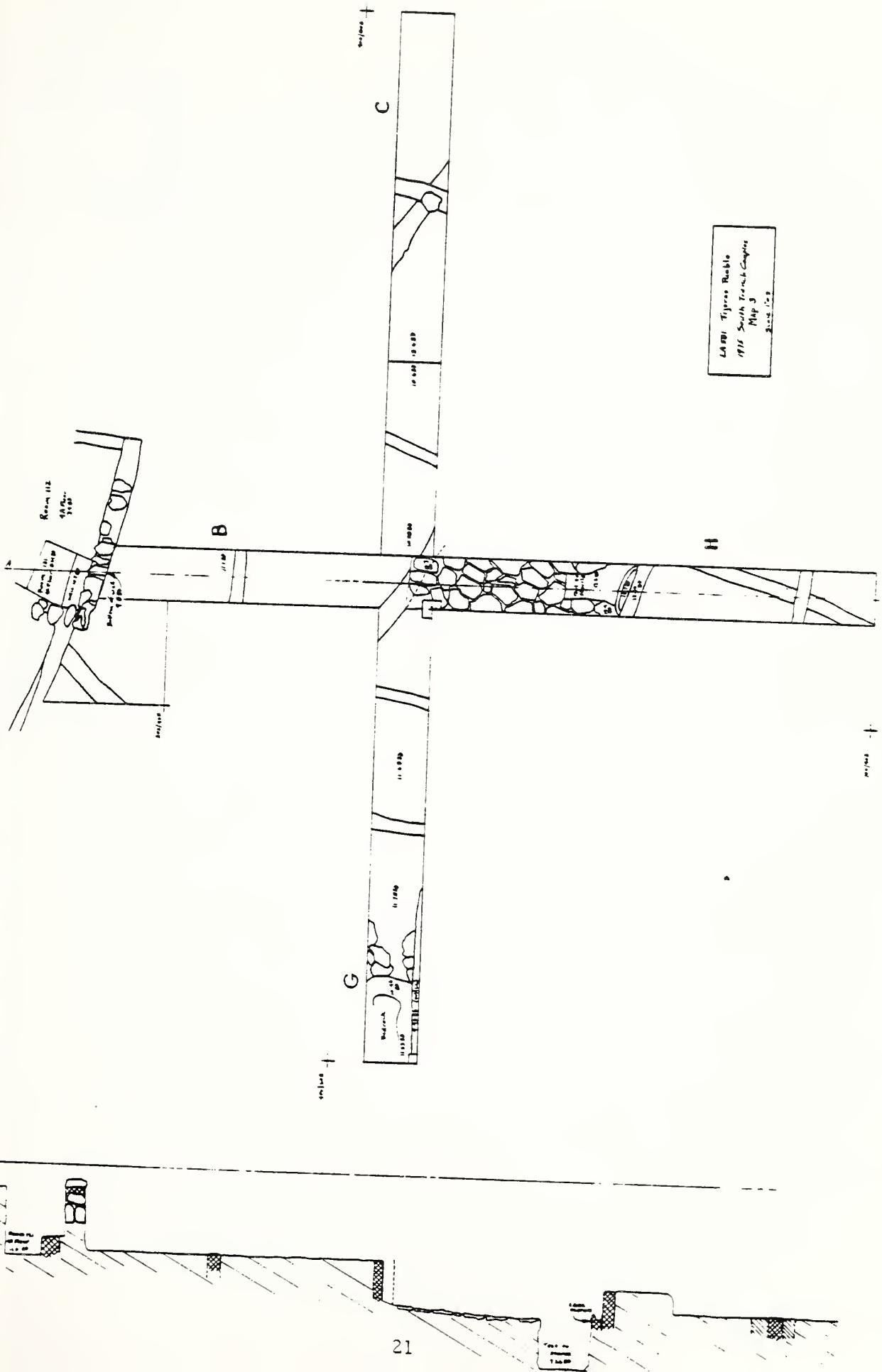




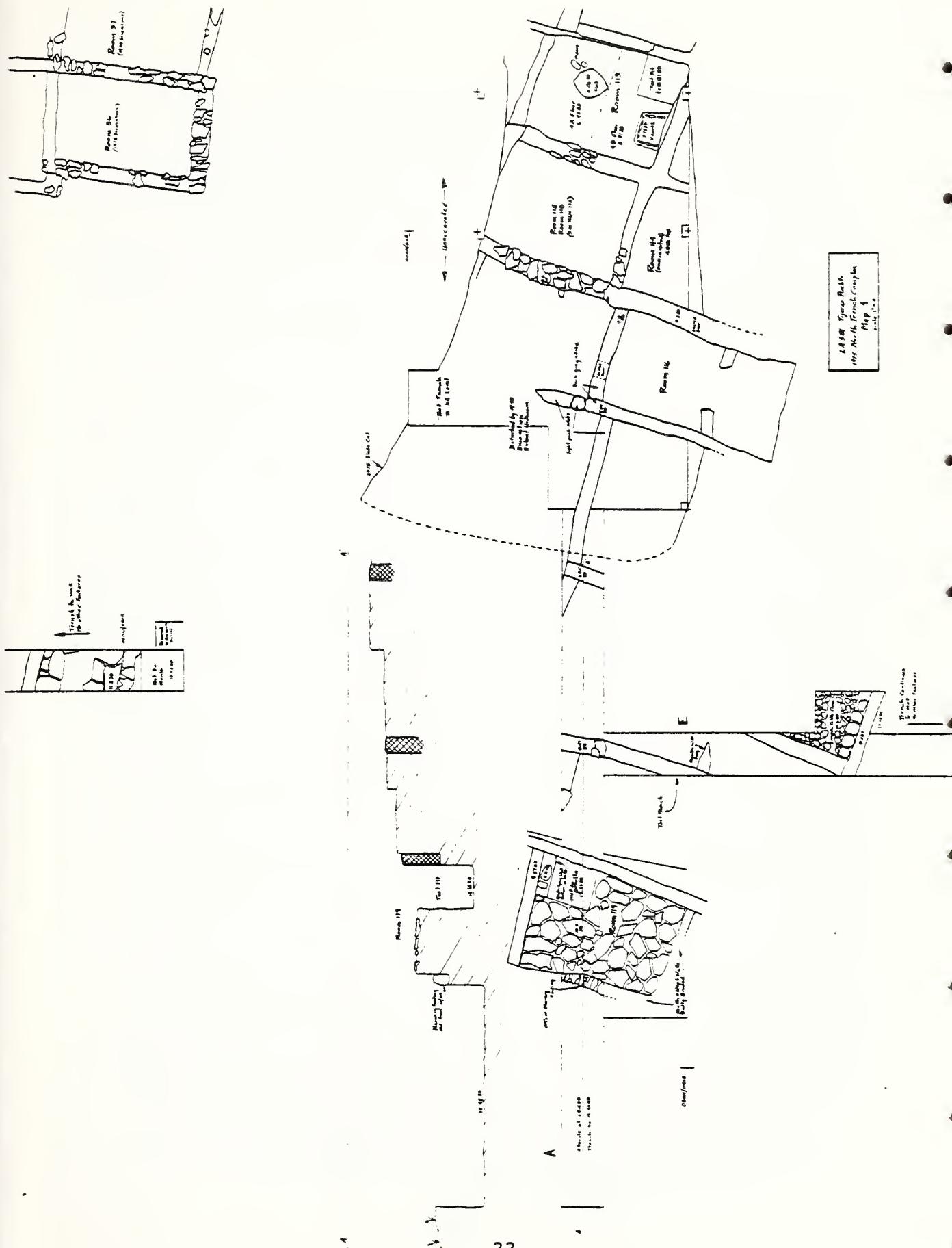
La Tierra Pueblo  
1975 Excavation  
Map 2a  
1975













Trenches E and F (map 1b) northeast and northwest of the blade cut revealed walls and slab floors which indicate that, at one time, Tijeras Pueblo extended 50 feet north of the massive north wall of the later occupation of the main mound. (It should be noted that unless two walls of the same room have been located, no room number is assigned. Therefore, of the walls and floors exposed in the trenches, room numbers were assigned only to room 119 and room 122.) A discussion of the chronological interpretation of Room Block II is deferred to the next section of this report.

In order to better understand the occupational history of Tijeras Pueblo, additional excavation was carried out in the northwestern portion of the main mound (Room Block III, map 1b). Rooms 60, 102, 107, 108, and 110, which had previously been partially excavated or trenched, were excavated to bedrock or sterile soil. Of these rooms, only 107 and 110 had been built on bedrock. Rather thin cultural material, not trash deposits, underlay rooms 60 and 108. As had been expected on the basis of trenching during the 1974 season, room 108 proved to be a large (21 feet by 23 feet), rectangular kiva. Time permitted complete excavation of only the eastern half of the room, but this revealed typical kiva floor features (ashpit, firepit, deflector complex, ventilator and post roof supports). The walls of room 108 are constructed of adobe with interior upright support posts. Samples of the posts taken in 1974 have been dated to A.D. 1313 (see appendix A). Room 108 had several layers of plaster adhering to those walls which had not completely collapsed. Though the layers of plaster are of various colors (white, black, green and red), no "murals" seem to have been present. At some time before A.D. 1390, when room 64 (the kiva excavated in 1974) was built, room 108 was destroyed by a very severe fire that caused chunks of adobe to fuse.

As a result of preliminary analysis of materials excavated from trash deposits in 1974, it was felt that the sample of trash obtained from the northwest portion of the site seemed inadequate for fine chronological control (Cordell 1975:9).

For this reason, an additional 10-foot square grid, 020N/00W, was excavated to sterile (reached in level 2P varying from 9.14' to 11.64' B.D.). In addition, grid 100S/030E, another 10-foot section of trash, was excavated in the south-central area of the main mound. This was also excavated to sterile (which occurred in level 2J between 24.8' and 28.9' B.D.). It is hoped that these

two samples of trash, combined with those excavated in previous seasons, will provide enough information to refine the chronology of the main mound. (All stratigraphic excavations of trash deposits are shown as shaded areas on map lb.)

During the 1975 season, it also seemed imperative to try, as much as possible, to tie the "outliers" chronologically to the main mound. During the 1974 season, surface collections of the outliers that are still in existence (all those excluding Mera's Mound H which was excavated in 1968 and is now under a warehouse) had been made by our survey crews. At that time, it was noted that Mera's Mounds L and J most probably at one time consisted of a single L-shaped outlier that is now bisected by a modern arroyo. This has been designated Room Block VII (map lb). It was hoped that this area could be surface stripped, its rooms mapped, and an adequate sample of trash removed in order to determine to which construction phase of the main mound it corresponds and whether or not subsistence resources varied at all from those reflected in the main mound. Since most of this outlier is on private land, permission for this work was sought from the landowner. Permission to surface strip the area was denied, but we were allowed to excavate a sample of trash. Severe erosion and modern disturbance (bike trails and a modern refuse dump) in this part of the site made locating deep trash deposits extremely difficult. Four 3'x3' tests were sunk on the perimeter of the outlier. Of these, only the one at 170N/130E seemed promising. This was expanded to a 10-foot grid and excavated to sterile soil which was reached in level 2E at 12.39' B.D.

Finally, a rather marked vegetation change and a single, partly exposed masonry wall in the area of Mera's Mound I lead us to believe that it might have been a water control feature of some kind. This notion was supported by the fact that the 1974 survey crews had recovered very few ceramics from the surface of this feature. It did not have the amount of surface debris usually associated with habitation areas. At the end of the 1975 season, a back hoe was rented and used to trench across the vegetation change and beyond it (map lb). A single north-south trench was put through the feature, slightly west of its center. The trench was 2 feet deep and discontinuous, because the back hoe was stopped when the operator encountered any resistance. The back hoe uncovered extensive areas of wall fall and a well-preserved north wall which had not been visible on the surface. Further cleaning of the trench was undertaken by hand. Examination of the walls indicated curvature

and the likelihood of a circular structure. Three test pits were sunk in order to confirm this, and sections of wall were encountered in each (map 1b). Mound I, therefore, appears to be a "Great Kiva," at least in terms of size. It measures 45 feet in diameter with double coursed masonry walls averaging 1.7 feet in thickness. Judging by the wall fall, at one time the wall stood at least 7.5 feet high (Cordell and Bertram 1975). The interior fill of the feature is extremely hard, uniform clay with very little cultural material. (Samples of the fill are currently being analyzed by Dr. R.N. Rogers of Los Alamos Scientific Laboratory.) A possible floor was exposed at a depth of 4 feet. The floor appears only as a slightly more compact clay surface with discontinuous areas of burning. Fragments of burned wood were removed from immediately above the floor and have been sent to the Tree-Ring Laboratory at the University of Arizona in the hopes that they will prove sufficient for dating. The few sherds recovered in hand cleaning of the trench included Santa Fe Black-on-white, Chupadero Black-on-white, Saint John's Polychrome and Agua Fria Glaze-on-red in addition to plain ware.

Twelve burials were recovered during the 1975 season. Of these, four are infants and eight are adults. Of the eight adults, six are males and two are females. A complete study of this skeletal material appears as appendix B of this report. Six of the burials were found in the trash deposit north of Room Block II. Two of the burials came from the trash area excavated south of Room Block V. The remainder were recovered from the trenches. Provenience designations appear as the excavation number of each burial in appendix B.

In the discussion of the skeletal remains (appendix B), Ferguson notes that some of the individuals recovered display an inordinate number of Harris' lines. These lines are generally interpreted as indicating episodes of disease suffered during childhood, during the period of long bone growth. While such childhood disease is often the result of malnutrition, Harris' lines may also be the result of lead poisoning (Hayden 1975:18). In view of the use of lead in the manufacture of glaze paint, the possibility of lead poisoning is high. Recent investigation (David H. Snow, personal communication 1976) has shown that lead accumulates in the bones and teeth of individuals suffering from lead poisoning and may be detected in archeological populations. Teeth from the Tijeras population have been submitted for analysis of lead content, and until results have been obtained, the meaning of the Harris' lines remains obscure.

At the end of the 1975 season, a total of 36 burials had been recovered from Tijeras Pueblo. This is, of course, considerably fewer than one would expect from a fairly large site which was occupied for slightly more than 100 years. Of these 36 human skeletons, 23 are adult. The sexes of the adults are 11 female and 13 male.

Appendix A of this report lists the 122 tree-ring dates obtained from specimens excavated during the 1974 field season. Dating was done by the Laboratory of Tree-Ring Research, University of Arizona. The majority of the dates relate to room 64, the smaller, later kiva in the main mound. Room 64 was, quite certainly, built in A.D. 1391. The tree-ring dates also indicate that room 108, the larger, earlier kiva was constructed in A.D. 1313.

In summary, during the 1975 field season, we continued to work on the occupational history of Tijeras Pueblo. An additional nine rooms were excavated in the main mound, bringing the number of rooms excavated in that area to 78 (with a total of 84 for the site). In addition, two stratigraphic samples of trash were excavated in the main mound and considerable trenching done. A stratigraphic sample of trash was also obtained from the edge of Room Block VII, and Mera's Mound I was trenched revealing that it is most probably a Great Kiva.

#### V. Tijeras Pueblo Through Time

This section provides a tentative summary of the history of occupation at Tijeras Pueblo as this may be reconstructed from tree-ring dates, architecture, ceramic frequencies and that portion of the faunal analysis which has been completed. A fuller, more complete discussion clearly depends upon detailed analyses of the data, some of which are in progress, others of which are planned. Throughout this discussion, mention will be made of problems which we hope to solve through excavation during the 1976 season, as well as those which will require further analysis.

The location of Tijeras Pueblo would seem to have many advantages for prehistoric populations. As noted, the site is situated at a relatively low elevation in the canyon bottom, adjacent to alluvial soils. In addition, the site was constructed on a limestone outcrop which provides a stable foundation and a source of building material. Access to the diverse resources of different elevations is relatively easy. Probably most important, the seep immediately north of the

main mound may have provided a convenient source of perennial water. It is likely that the site was used as a camping place before construction of the 14th century pueblo began. The survey crews recovered a few Lino Gray sherds from the vicinity of Tijeras Pueblo which would seem to indicate some use of the area at about A.D. 900 (Blevins and Joiner n.d.). While it is possible that year-round occupation of the site first consisted of a small pithouse village, perhaps with associated surface rooms (similar to L.A. 10794, which was excavated by the Laboratory of Anthropology during 1975), as suggested by the reference to a pithouse in the 1948 excavation, our more recent investigations have failed to confirm this, at least as far as the main mound is concerned.

The first period of major construction at Tijeras Pueblo occurred during a time of population aggregation in Tijeras Canyon (Blevins and Joiner n.d.). This would correspond to the Classic Period of northern Rio Grande prehistory in terms of ceramics, though it would be the Coalition Period with reference to dates. It should be noted that Wendorf and Reed (1955) define the Classic as beginning with the introduction of locally made red-slipped glaze decorated wares (Agua Fria Glaze-on-red) and place this occurrence at A.D. 1325. Honea (1966) also places the beginning of Agua Fria Glaze-on-red at A.D. 1325 and of San Clemente Glaze-polychrome and Cieneguilla Glaze-on-yellow to A.D. 1350. Despite extensive investigations of trash at Tijeras Pueblo, no levels have been found which are completely devoid of Agua Fria. In addition, tree-ring samples from room floors which contained all of the above-mentioned types have been dated at A.D. 1313 (rooms 12 and 108), A.D. 1321 (room 13), and A.D. 1322 (room 88). I would suggest, on this evidence, that a beginning date for Agua Fria Glaze-on-red at Tijeras Pueblo be revised downward to about A.D. 1313. The presence of San Clemente and Cieneguilla on room floors which predate A.D. 1350 may only indicate that these rooms continued to be occupied through the introduction of these later types. The presence of Agua Fria in the lowest levels of trash would, however, strongly support the revision in date for the first appearance of this type.

It is difficult to estimate the size of Tijeras Pueblo in the early 1300's. At this point, it seems probable that the pueblo may have reached its greatest size during the earliest phase of its construction, but this has not been conclusively demonstrated as yet. Certainly the most reliable way of determining the chronological position of room construction would be to have a series of consistent

tree-ring cutting dates associated with roof fall. The absence of tree-ring samples from many of the rooms and the possibility that some of the wood may have been reused clearly makes the ideal impossible to attain. On the other hand, our excavations have indicated that some of the criteria generally used to date room construction are notably unreliable at Tijeras Pueblo. Differences in building material (adobe vs. masonry), for example, seem to be one of those attributes that bears little or no relation to chronology (Cordell 1975:5 and Table 2).

I am also unconvinced that frequencies of sherds recovered from room floors adequately reflect the chronological sequence of room construction. Generally, so few sherds are recovered from direct association with room floors that the frequency of types is almost certainly not representative of the frequency of types in use at the site in general. Markedly different ceramic frequencies have been recovered from rooms which share the same major bearing walls and clearly must have been constructed at the same time (for example, rooms 105 and 103 in Room Block I). It is also likely that sherds associated with the floors of abandoned rooms may reflect functional variation of the rooms as well as their chronology. While the frequency of ceramic types does seem to be temporally sensitive in the samples obtained from the trash deposits (Judge 1974:34-35), the same is not necessarily true of ceramics from room floors. It should be remembered that Tijeras Pueblo was occupied for only about 125 years and that with only a few exceptions (notably San Clemente Glaze-polychrome and Cieneguilla Glaze-on-yellow), new ceramic types, which would provide finer chronological control, were not introduced while the site was inhabited.

For these reasons, I have assumed, as a rule of thumb, that rooms which were constructed on culturally sterile ground or on bedrock represent the first phase of building at the site. Although this may seem, intuitively, to be completely sound, some of the rooms constructed on bedrock were subject to intensive remodeling, and cultural debris beneath them may have been deliberately removed (swept away). Nevertheless, Table 2 provides a list of rooms and their room block locations (refer to maps 1a and 1b) which were constructed either on culturally sterile ground or on bedrock. From Table 2, it should again be noted that at Tijeras Pueblo the material used in wall construction is apparently not temporally significant. The use of masonry in early construction is limited to Room Block III and may be of either social or functional

Table 2

Rooms Constructed on Culturally Sterile Ground or Bedrock

<u>Room No.</u>	<u>Room Block</u>	<u>Wall Construction</u>
1 (2nd floor)	IV	adobe
12	VI	adobe
13	VI	adobe
29 (2nd floor)	I	adobe
30 (2nd floor)	I	adobe
43 (2nd floor)	I	adobe
55	III	adobe
88	V	adobe
90	V	adobe
101	I	adobe
105	I	adobe
106	I	adobe
107	III	masonry
109	III	masonry
110	III	masonry
116 (3rd floor)	II	adobe
117	II	adobe
118	II	masonry
121	II	adobe

significance. These possibilities will be subject to further analysis. It is also important to note that seemingly early rooms occur in all the room blocks of the main mound as well as in the outlier designated Room Block VI.

It would be most satisfactory, in terms of establishing the chronology of building at Tijeras Pueblo, to have tree-ring cutting dates from roof fall of all reputedly early rooms. This, of course, has not been possible. Of the rooms listed in Table 2, only rooms 1, 12, 13, 55 and 88 have yielded tree-ring dates. These, along with other rooms which have yielded fairly early dates, are listed in Table 3. Of those rooms which appear in both Tables 2 and 3, most have dates which cluster in the early 14th century. Room 55 with a date of A.D. 1352 is an exception. This room is in Room Block III in the west-central part of the main mound. It was built on bedrock; however, it is uphill from the earlier rooms to the east (map 1a). It is also just west of the west wall of room 107, an unusually thick masonry wall which may have been an outer wall at the time that the room block was first constructed. It would seem that the line of rooms sharing a common bearing wall in the west-central part of the site (rooms 54, 55, 56, 57, and 58) represent an addition to the earliest structure. The date of A.D. 1294 obtained from the fill between the first and second floors of room 1 is not unique in being of the 13th century. Unfortunately, the few samples which have yielded comparably early dates have not been associated with room floors.

Room 108, the large kiva, was apparently not constructed on completely sterile soil. The cultural remains below the floor were not trash deposits however. Rather, there is an apparent adobe layer with some thin cultural debris. It is possible that the adobe and debris were associated with the building of room 108. This would make the early date, which is certainly the date of construction, reasonable. Further work in the area of room 108 is planned for the 1976 season and should clarify this.

It now appears that the first construction in the main mound may have been the most extensive. Early rooms are located in all of the room blocks of the main mound, and walls dating to the early period of construction have been located in trenches A, E and F north of Room Block II and in trenches B, C, D and H south of Room Blocks I and II (map 1b), underlying what was later to be a plaza area. In order to assess the size of the first occupation of Tijeras Pueblo, it is critical to date the outliers as well. It is

Table 3

Early Tree-Ring Dated Rooms

<u>Room No.</u>	<u>Room Block</u>	<u>Date A. D.</u>	<u>Sample Provenience</u>
1	IV	1294r*	above 2nd floor
12	VI	1313r	floor
13	VI	1321r	floor
31	IV	1311r	fill above floor
55	III	1352+v**	floor
88	V	1322r	floor
108	III	1313r	interior wall support

\*r indicates a cutting date

\*\*+v indicates that one or more rings may be missing, but the date is probably within a very few years of being the cutting date.

clear from the information presented in Tables 2 and 3 that the outlier designated Room Block VI relates to the first phase of building at the site. As I have mentioned, we were unable to surface strip or excavate rooms in the outlier now designated Room Block VII. We did, however, obtain a sample of trash from immediately east of these rooms (170N/130W). The levels of trash from the outlier were excavated in arbitrary .5 foot levels which did not cross-cut natural strata.

The thickness of trash deposits reflects an unknown amount of time, the amount of deposition being related to the number of people using the trash deposit, the frequency with which trash is dumped, and, I assume, other variables. Although it has been noted that the frequency of various types of ceramics in trash deposits is temporally sensitive, I have found that frequency data are not fine enough to be utilized in relating trash deposits from one part of the site to those from another. The ceramics recovered from 170N/130W show a regular increase in the frequency of redware from 35% to 65% of the painted sherds. Based on these frequencies alone, it might appear that Room Block VII was occupied when the adobe wash was being formed in grid 20N/0W in the main mound; i.e., during a period of disuse or abandonment of the main mound. This is because frequencies of redware from 20N/0W go from 36% to 71% of the painted ceramics in the levels on either side of an adobe wash. In order to explore this, I used the actual numbers of each type of decorated ware per level from 170N/130W and compared these to the actual numbers of each decorated type per level from 20N/0W using chi-square as a measure of heterogeneity (Mosteller 1968, Workman 1969). (The lower the chi-square score obtained, the more homogenous the samples being compared.) Importantly, the total size of the samples being compared is approximately the same. It was found that the lowest scores, indicating the best fit, were obtained when levels from 170N/130W were matched with levels below the adobe wash in 20N/0W. These scores ranged from 1.65 to 4.51. Higher scores, ranging from 15.00 to 49.40, were obtained when the 170N/130W levels were compared to levels both above and from the erosional disconformity in grid 20N/0W. It would thus appear that the outlier, Room Block VII, like the outlier, Room Block VI, was most probably constructed at the time of the early period of construction in the main mound.

Continued work on the outliers will be conducted during the 1976 to more precisely determine their chronological relationship to the main mound. However, on the basis of the tentative relationships

noted above, an interesting possibility emerges. The outlier which now appears to have been a Great Kiva is higher in elevation than the main mound. If one stands at the center of this feature, all of the outliers and the main mound are clearly visible. Further, the Great Kiva appears to be roughly in the center of an open circle of room blocks which includes the main mound. The circle is open to the north where a ridge completes the geometric pattern. If all the constructions are contemporary and relate to the early phase of construction at Tijeras Pueblo, then it is possible that the room block kiva, room 108, served those people inhabiting the main mound at the early period, whereas the Great Kiva may have served the entire community.

In view of the series of expectations discussed in the beginning of this report, it is important to determine whether or not construction of the initial phase proceeded gradually, indicating "normal" population growth, or whether it occurred rapidly, indicating a sudden movement to the site. Without further analysis, conclusions in this regard must be viewed as very tentative. It does appear, however, from an examination of tree-ring dates, that there was almost continual building between about A.D. 1313 and A.D. 1368. From observation of room alignments and wall abutments, it would appear that rooms were added in small groups of from four to six rooms at a time. There also appears to have been considerable remodeling of rooms and renovation of floors. Since the period of time of this building comprises only about  $2\frac{1}{2}$  human generations, it would seem plausible that the building relates to in situ population growth following an initial aggregation of population at the site. Obviously, more work is needed to clarify this interpretation.

As has been previously noted (Judge 1974:42, Cordell 1975:9-10), erosional disconformities (adobe wash) have been observed in the stratigraphic tests made in various parts of the main mound. These disconformities result from the weathering of adobe walls and would, therefore, indicate a period of either partial site disuse or abandonment. Judge (1974:37) notes one marked erosional disconformity when glazewares attained frequencies of about 45% and suggests another period of site disuse, based primarily on architectural rather than stratigraphic evidence, when Glaze A had attained a frequency of about 60%. In the stratigraphic tests made during the 1974 season, it was noted that weathered adobe appeared in trash areas adjacent to walls representing the first construction period and occurred when Glaze A comprised about

20% of the painted ceramics. In those stratigraphic tests which were 10 to 15 feet north of early occupation walls, there was no sterile layer of wash; but chi-square tests comparing ceramic frequencies of successive levels within the same stratigraphic test indicated a statistically significant break in ceramic frequencies when about 20% of the decorated ceramics were Glaze A. Assuming that changes in ceramic frequencies will be gradual through time, statistically significant breaks were interpreted as being a good indicator of discontinuities in the occupation of the site in those areas which are too far from architectural features to contain the remains of eroded walls.

Despite what might be considered the impressive logic of all this, the results of the 1974 stratigraphic tests were confusing. In one stratigraphic test (30N/20W), an erosional disconformity occurred but did not coincide with a statistically significant break in ceramic frequencies. In the same grid, a statistically significant break in ceramic frequencies occurred above the level of adobe wash but was not itself associated with evidence of erosion. Since the stratigraphic test had been excavated in natural levels which were not of comparable size, it was proposed that some distortion was probably the result of different sample sizes. In order to clarify the situation, and most importantly, to determine whether Tijeras Pueblo was abandoned once or twice before its final abandonment, two additional stratigraphic tests were made in 1975 and both were excavated in arbitrary levels of equal size. Stratigraphic test 20N/0W was excavated north of Room Block II. The west profile of the test contained a layer of adobe wash which ran diagonally from level 2H in the south part of the grid to level 2K in the north. The adobe wash did not appear in the east wall of the test. Ceramic frequencies above and below the adobe wash did vary significantly when compared. As previously mentioned, redware frequencies range from 36% in the level below the disconformity to 71% above the disconformity.

Stratigraphic test 100S/30E was located south of Room Block V. The test yielded architectural evidence of two building episodes. A masonry footing was discovered just on the surface. This appears to be the south wall of room 93 (map 1b). An off-set adobe footing was encountered in the level below this wall. No statistically significant break in ceramic frequencies occurs when these two levels are compared, although a statistically significant break does occur when level 1A (surface) is compared with combined levels 2A and 2B (the level containing the adobe

footing and the level immediately below it). Redware occurs in a frequency of 52% in the level of the adobe footing. Sterile soil was finally reached in level 2J of this test with no further discontinuities in ceramic frequencies. As Burtchard notes (appendix C), there is a decline in the total amount of material in level 2G of this test and it is associated with some adobe wash, but it does not correspond to a statistically significant break in ceramic frequencies.

These preliminary results may again seem confusing; but I believe some conclusions are justified, and I think that some of the reasons for the conflicting observations may be given. First, it should be remembered that tree-ring dates indicate almost continual building at the site from A.D. 1313 until A.D. 1368. This, I would propose, corresponds to the initial occupation of the site. The length of time encompassed by these dates would have permitted a considerable amount of trash to have accumulated. There is widespread evidence of adobe wash in the stratigraphic tests which appears to relate to the erosion of initial phase rooms which had been abandoned. A marked cluster of tree-ring dates indicates considerable construction in the main mound during the early 1390's. The gap in tree-ring dates indicates disuse of the site for only about 20 years. I am not at all sure how much change in the relative frequencies of ceramic types might have occurred in a 20-year period. This should be amenable to empirical test. It should be remembered that the field school uses a simplified ceramic typology (Judge 1974:29-30), which more than likely obscures the kind of change one might expect over a relatively brief period of time. Finally, as I have said, I do not think ceramic frequencies are appropriate for correlating stratigraphic samples from different parts of the site. Detailed ceramic analyses will be undertaken at the conclusion of the 1976 season. These should provide the basis for fine-grained intra-site dating. Until the results of these analyses are available, most conclusions are premature. Nevertheless, on the evidence we now have, it appears that the first period of construction at Tijeras Pueblo was the most extensive and that it was followed by a relatively brief period of site disuse.

The middle period of construction at the site seems to have taken place in the early 1390's, and at this time, the entire configuration of the site may have changed. I would suggest that all the outliers may have been abandoned. The large kiva, room 108, was no longer in use. Instead, the occupation seems to have been restricted to the main mound and the rooms to have been organized as they appear on map la. A large masonry wall was constructed

running east-west on the northern perimeter of the main mound. Room 64 may have served as the only kiva, and the central area of the main mound became a plaza. This occupation is then the relatively "planned" looking phase previously discussed (Cordell 1975:11, Judge 1974:39).

Evidence of a final occupation of Tijeras Pueblo is as tantalizing as it is meagre. In the area of Room Block III, there are a few wall footings consisting of upright masonry slabs visible on the surface. These resemble wall footings illustrated by Lambert from Paa-ko (1954:33). Unfortunately, these are so severely eroded that no room definition is possible. Small, square, badly eroded, masonry-lined hearths have been found on the surface of the main mound in the area of Room Blocks II and V. No walls have been found in association with these hearths. It is tempting to think that there was a brief, small reoccupation of the site during the mid or late 15th century; however, no late glaze ceramics have been recovered from the trash deposits. On the other hand, three sherds which have been identified as Glaze D or E (Alden C. Hayes, personal communication 1975) were recovered from our excavation in Room Block II. They were in the bottom of a disturbance that seemed to be a trench from the 1948 excavation.

During the 1975-1976 academic year, analysis of the faunal material from Tijeras Pueblo was begun. During the fall, a rough sort of the fauna from a single stratigraphic test (100S/030E) was accomplished, and forms which should be adequate for the complete faunal analysis were developed. The forms, on card format, allow sorting by provenience unit, species or anatomical element. They provide space for observations which include the approximate age of the larger animals, type and location of butchering marks, pre- or absence of surficial checking, evidence of charring and the lengths of rib and long bone fragments. The forms may be easily coded for keypunching. Analysis of the fauna is now in progress, and a discussion of most results will have to be deferred. A determination of the minimum number of individual animals, per level, from 100S/030E has been accomplished, and this warrants brief discussion.

The inhabitants of Tijeras Pueblo exploited both cotton tail rabbits (Sylvilagus auduboni and S. floridanus) and jack rabbits (Lepus californicus). Five genera of rodents are commonly represented in trash deposits. Whether or not all of the rodents were utilized for food is unknown at present, but methods for determining whether

bone has been boiled are being developed by Dr. R. N. Rogers of Los Alamos Scientific Laboratory and Sylvia Thompson, a UNM student. Of the larger animals, mule deer (Odocoileus hemionus) and antelope (Antilocapra americana) are about equally represented. Mountain sheep (Ovis canadensis) occur in small numbers as do turkeys (Meleagris gallopavo). There is a considerable diversity in other birds and in reptiles. Bison (Bison bison), bobcat (Lynx rufus), dogs (Canis sp.), and badger (Taxidea taxus) are present but rare.

Preliminary examination of the age distributions of the deer, antelope and sheep indicate that these animals were hunted throughout the year. In 100S/030E, the count of minimum numbers of individuals does show that deer, antelope and sheep decrease through time as numbers of rabbits and rodents increase, but the changes are not striking.

#### VI. Preliminary Conclusions

The University of New Mexico field school in archeology has been intensively investigating Tijeras Pueblo for the past 5 years. Our research orientation is concerned with the relationship between population fluctuations and resource availability through time. Excavation of the 14th century pueblo has been supplemented by a survey of 25 sections of the South Sandia - Tijeras Canyon area. Data obtained from the survey indicate that there was a considerable population increase in the area prior to the founding of Tijeras Pueblo and that the sites relating to this increase are located on or adjacent to alluvial land (Blevins and Joiner n. d.). This population increase corresponds to the Rio Grande Coalition Period as defined by Wendorf and Reed (1955:143), although the exact dates of this period in the canyon have not been determined. In terms of ceramics, Tijeras Pueblo was founded early during the succeeding Classic Period. This has been dated to about A.D. 1313 at the site. The Classic Period in the canyon is marked by a shift to aggregated settlements, the two most prominent being Tijeras Pueblo and San Antonio (L.A. 24). The shift to aggregated communities is accompanied by an increase in both the number and kinds of limited activity sites in the canyon. It has been suggested that these phenomena are related and may reflect a response to resource depletion.

With the caveat that further excavation and analysis may prove us wrong, it now appears that the initial occupation of Tijeras Pueblo was the largest, and that the site consisted of a central Great Kiva and several outliers which included the main mound. Tree-ring dates indicate that room clusters were gradually added until about A.D. 1368, reflecting in situ population growth at the site. Probably sometime shortly after A.D. 1368, Tijeras Pueblo seems to have suffered a great decrease in population or complete abandonment. This is reflected by widespread erosional disconformities in stratigraphic tests in the main mound. No evidence of violent destruction accompanies the population decrease, and it is possible that it relates to further resource depletion or environmental stress.

A period of rebuilding occurred at the site in the early 1390's, but this seems to have been restricted to the main mound. The size of this middle period of occupation does not seem to have been as great as the initial phase, and at this time, the site achieved roughly its present configuration. That is, it consisted of a more or less U-shaped arrangement of room blocks around a central plaza area. The absence of tree-ring dates in the 15th century and the absence of late glaze ceramics from trash deposits indicate that the middle period occupation was relatively brief.

Evidence for a final period of construction at Tijeras Pueblo consists of a few, badly eroded wall-footing remnants and hearths and three late glaze sherds recovered from a disturbed portion of the site. It is possible that, with its population gone, the site served as a summer agricultural settlement or other limited activity locus during Late Classic or Early Historic Period times.

Although Tijeras Pueblo itself was largely abandoned during the Classic Period, San Antonio continued to be occupied; and the number of limited activity areas in the canyon actually increased during the Late Classic Period. This may indicate further aggregation of population as a response to resource stress. During the Historic Period, there seems to have been a great decline in population in the canyon area. Whether this reflects the long run failure of an adaptive strategy or whether it was the result of general population dislocation as the result of the Spanish conquest, is at present unknown.

## VII. References

Binford, L. R.

- 1968 Post-Pleistocene adaptations, in S. R. Binford and L. R. Binford (eds), New Perspectives in Archeology. Chicago, Aldine.
- 1972 An Archaeological Perspective. New York, Seminar Press.

Blevins, B. B.

- 1975 The archeological survey of Tijeras Canyon, in L. S. Cordell, The 1974 Excavation of Tijeras Pueblo, Cibola National Forest, New Mexico Archeological Report No. 5, USDA Forest Service, Southwestern Region, Albuquerque.

Blevins, B. B. and C. Joiner

- n.d. Report on the University of New Mexico's Archeological Survey of Tijeras Canyon, New Mexico. Manuscript on file, Department of Anthropology, University of New Mexico.

Burthard, G. C. and D. Cattle

- n.d. Population dynamics and resource availability: an archaeological consideration of nutritional security. Paper presented at the Symposium on Paleonutrition, Society for American Archeology, Annual Meeting, St. Louis, Mo. 1976.

Cohen, Y.A.

- 1974 Man in Adaptation, The Cultural Present, 2nd ed., Chicago, Aldine.

Cordell, L. S.

- 1975 The 1974 Excavation of Tijeras Pueblo, Cibola National Forest, New Mexico, Archeological Report No. 5, USDA Forest Service, Southwestern Region, Albuquerque.

Cordell, L. S. and J. Bertram

- 1975 A Great Kiva at Tijeras Pueblo Report of the 1975 University of New Mexico Field School. Paper presented at the 1975 Pecos Conference, Salmon Ruins, New Mexico.

- Cully, A.  
n.d. Plants Collected in the Vicinity of Tijeras Pueblo.  
Manuscript on file, Department of Anthropology,  
University of New Mexico.
- Glassow, M. A.  
1972 Changes in the adaptations of southwestern Basket-  
makers: a systems perspective, in M. P. Leone, ed.  
Contemporary Archeology, Carbondale, Southern  
Illinois University Press.
- Hayden, B.  
1975 The carrying capacity dilemma, in A. C. Swedlund,  
ed. Population Studies in Archaeology and Biological  
Anthropology, A Symposium, Memoir 30, American  
Antiquity v. 40, pt. 2.
- Hendron, J. W.  
1940 Prehistory of El Rito de Los Frijoles. Southwestern  
Monuments Association, Technical Series, No. 1.  
Coolidge.
- Hibben, F. C.  
1941 Evidences of Early Occupation in Sandia Cave, New  
Mexico, and Other Sites in the Sandia-Manzano Region.  
Smithsonian Miscellaneous Collections, vol. 99, no. 32.
- Honea, K. M.  
1966 Report to the Eighth Southwestern Ceramic Seminar,  
Santa Fe. Laboratory of Anthropology. Ms.
- Irwin-Williams, C.  
1973 The Oshara Tradition: Origins of Anasazi Culture.  
Eastern New Mexico University Contributions in  
Anthropology, v. 5, n. 1.
- Judge, W. J.  
1973 PaleoIndian Occupation of the Central Rio Grande  
Valley, New Mexico. Albuquerque, University of  
New Mexico Press.
- 1974 The Excavation of Tijeras Pueblo 1971-73: Preliminary  
Report, Cibola National Forest, New Mexico.  
Archeological Report No. 3, USDA Forest Service,  
Southwestern Region, Albuquerque.

- Judge, W. J. and J. Dawson  
1972      PaleoIndian settlement technology in New Mexico,  
Science, v. 176, pp. 1210-1216.
- Kelly, V. C.  
1963      Geologic Map of the Sandia Mountains and vicinity,  
New Mexico. The U.S. Geological Survey and the  
University of New Mexico.
- Kidder, A. V.  
1932      The Artifacts of Pecos. Papers of the Phillips Academy  
Southwestern Expedition, No. 7. New Haven.
- Lambert, M. F.  
1954      Paa-ko, Archaeological Chronicle of an Indian Village  
in North Central New Mexico. School of American  
Research Monograph 19, Santa Fe.
- Loose, R. W.  
1974      Geology at Tijeras Pueblo, in W. J. Judge, The Excava-  
tion of Tijeras Pueblo 1971-73: Preliminary Report,  
Cibola National Forest, New Mexico. Archeological  
Report No. 3, USDA Forest Service, Southwestern  
Region, Albuquerque.
- Mera, H. P.  
1935      Ceramic Clues to the Prehistory of North Central New  
Mexico. Laboratory of Anthropology, Technical Series  
Bulletin No. 8. Santa Fe.
- Martin, P. S. and F. Plog  
1973      The Archaeology of Arizona, A study of the Southwestern  
Region. Doubleday/Natural History Press, Garden City.
- Middle Rio Grande Council of Governments of New Mexico (The)  
1974      Decision-Making Guide for Land Use Planning #1. Soil  
Data Handbook. Albuquerque.
- Mosteller, F.  
1968      Association and Estimation in Contingency Tables,  
Journal of the American Statistical Association, v. 63,  
pp. 1-28.

- Ortiz, A.  
1969      The Tewa World Space, Time Being & Becoming in a Pueblo Society. Chicago, The University of Chicago Press.
- Redman, C. L. (ed.)  
1973      Research and Theory in Current Archeology. New York, John Wiley & Sons.
- Reed, E. K.  
1949      Sources of Upper Rio Grande Pueblo Culture and Population, El Palacio, v. 56, n. 6, pp. 163-184.
- Robinson, W. J. et al.  
1972      Tree-Ring dates from New Mexico, I.O.U. Laboratory of Tree-Ring Research, University of Arizona.
- Schwartz, D. W. and R. W. Lant  
1972      Archeological Investigations at the Arroyo Hondo Site. School of American Research, Third Field Report.
- Shepard, A. O.  
1942      Rio Grande Glaze Paint Ware. Carnegie Institution of Washington Publication 528. pp. 129-262.
- Snow, D. H.  
1942      Archeological Survey, New Mexico State Highway Project, Tijeras Canyon, I-040-3(18)169. Museum of New Mexico Ms.
- Steward, J. H.  
1955      Theory of Culture Change. Urbana, University of Illinois Press.
- Tichy, M. F.  
1938      The Kivas of Paa-ko and Kuaua, New Mexico Anthropologist, v. 3.
- U. S. Department of Agriculture  
1974      Detailed Soil Map of the Rio Grande Valley, Tijeras and Sedillo Quadrangles.
- USDA Forest Service  
1974      Climate Records of the Tijeras Ranger Station, Cibola National Forest, New Mexico.

U. S. Department of Commerce

1974 Local Climatological Data. Annual Summary with Comparative Data, Albuquerque, New Mexico.

Vivian, R. G.

1974 Conservation and Diversion: water-control systems in the Anasazi Southwest, in T. Downing and M. Gibson (eds.) Irrigation's Impact on Society, Anthropological Papers of the University of Arizona, No. 25. Tucson.

Waddel, E.

1975 How the Enga cope with frost: responses to climatic perturbations in the central highlands of New Guinea, Human Ecology, v. 3, n. 4, pp. 249-475.

Wendorf, F.

1954 A reconstruction of northern Rio Grande prehistory, American Anthropologist, v. 56, n. 2, pp. 200-227.

Wendorf, R. and E. K. Reed

1955 An alternative reconstruction of northern Rio Grande prehistory. El Palacio, v. 62, n. 5, pp. 131-173.

Workman, P. L.

1969 The Analysis of Simple Genetic Polymorphisms. Human Biology, v. 41, pp. 97-114.



VIII. Appendices



**Appendix A**  
**Tree-Ring Dates**  
**1974 Season**



## LABORATORY OF TREE-RING RESEARCH

## Archeological Date Report

Site Tijeras Pueblo--1974 Collection

Page 1 of 4

Accession Number A-339 Control Number 31I-17 Date 9/10/75

Provenience	TRL Number	Field Number	Species	Dating		Remarks
				Inside	Outside	
Room 43	TJP-427	2C-7.1	PNN	1327p	- 1368r	
"	TJP-423	2F-T1-7.1	PP	1346	- 1373v	
"	TJP-424	2G-T1-7.1	PNN	1329p	- 1374v	
"	TJP-425	2C-7.4	PNN	1345p	- 1374r	
Room 47	TJP-432	2B-7.3	PNN	1325p	- 1368r	
"	TJP-431	2A-7.1	PNN	1345p	- 1375+r	
Room 64	TJP-504	F15-5A-7.3	PNN	1081p	- 1199++rB	
"	TJP-503	5A-F15-7.10	PNN	1056p	- 1201+vv	
"	TJP-438	2B-T1-7.5	PP	1211fp	- 1325vv	
"	TJP-522	T1-2B-7.4	PNN	1278p	- 1347++vv	
"	TJP-484	3A-7.35	PNN	1285p	- 1353++rB	
"	TJP-540	4A-7.9	PNN	1300p	- 1354vv	
"	TJP-526	4A-7.3	PNN	1307fp	- 1370vv	
"	TJP-483	3A-7.46	PNN	1262p	- 1378++r	
"	TJP-535	3A-7.32	PNN	1243p	- 1380++vv	
"	TJP-532	4A-N-7.7	PNN	1270p	- 1380++r	
"	TJP-542	4A-7.2	PNN	1309fp	- 1381vv	
"	TJP-543	4A-7.6	PNN	1306	- 1386vv	
"	TJP-474	3A-7.5-North	PP	1359p	- 1386vv	
"	TJP-525	4A-7.32	PNN	1311p	- 1387vv	
"	TJP-468	3A-7.43	PP	1353p	- 1387vv	
"	TJP-489	4A-7.26	PNN	1311p	- 1387r	
"	TJP-520	4A-7.19	PNN	1321p	- 1387r	
"	TJP-507	4A-7.1	PNN	1298p	- 1388vv	
"	TJP-528	3A-7.17N	PNN	1292p	- 1388+r	
"	TJP-537	4A-N-7.9	PNN	1297p	- 1388+r	
"	TJP-530	3A-7.43	PNN	1305p	- 1388+r	
"	TJP-496	4A-7.60	PNN	1262p	- 1389+r	
"	TJP-538	4A-N-7.1	PNN	1289p	- 1389+r	
"	TJP-508	3A-7.29N	PNN	1298p	- 1389+r	

## LABORATORY OF TREE-RING RESEARCH

## Archeological Date Report

Site Tijeras Pueblo--1974 CollectionPage 2 of 4Accession Number \_\_\_\_\_ Control Number 311-17 Date 9/10/75

Provenience	TRL Number	Field Number	Species	Dating		Remarks
				Inside	Outside	
Room 64 (Cont'd)	TJP-529	4A-N-7.2	PNN	1298p	- 1389+r	
"	TJP-518	4A-7.47	PNN	1301p	- 1389+r	
"	TJP-481	4A-7.28	PNN	1305p	- 1389+r	
"	TJP-517	3A-7.44	PNN	1311p	- 1389+r	
"	TJP-541	4A-7.10	PNN	1318fp	- 1389+r	
"	TJP-434	4A-7.65	PNN	1327p	- 1389+r	
"	TJP-494	4A-7.24	PNN	1330p	- 1389+r	
"	TJP-519	4A-7.16	PNN	1331p	- 1389+r	
"	TJP-480	4A-7.67	PNN	1332p	- 1389+r	
"	TJP-441	3A-7.23	PP	1338p	- 1389+r	
"	TJP-533	4A-N-7.3	PNN	1305p	- 1389r	
"	TJP-536	4A-N-7.5	PNN	1311p	- 1389r	
"	TJP-514	4A-N-7.2	PNN	1312p	- 1389r	
"	TJP-539	4A-N-7.4	PNN	1298p	- 1389+rB	
"	TJP-505	4A-7.42	PNN	1322p	- 1389+rB	
"	TJP-493	4A-7.68	PNN	1323p	- 1389+rB	
"	TJP-501	3A-7.30	PNN	1331p	- 1389+rB	
"	TJP-478	4A-7.33	PNN	1334p	- 1389+rB	
"	TJP-491	4A-7.35	PNN	1338p	- 1389+rB	
"	TJP-531	4A-7.22	PNN	1320p	- 1389rB	
"	TJP-516	4A-N-7.18	PNN	1352p	- 1390vv	
"	TJP-477	4A-7.40	PNN	1322p	- 1390+r	
"	TJP-487	4A-7.36	PNN	1333p	- 1390+r	
"	TJP-485	4A-7.40	PNN	1340p	- 1390+r	
"	TJP-497	4A-7.9	PNN	1354p	- 1390+r	
"	TJP-527	4A-7.8	PNN	1354p	- 1390+r	
"	TJP-498	4A-7.9	PNN	1356p	- 1390+r	
"	TJP-435	4A-N-7.10	PP	1366p	- 1390+r	
"	TJP-482	4A-7.25	PNN	1368p	- 1390+r	
"	TJP-523	3A-7.34	PNN	1331p	- 1390+G	
"	TJP-506	4A-7.51	PNN	1324fp	- 1390+rB	
"	TJP-524	4A-7.38	PNN	1324p	- 1390+rB	
"	TJP-515	3A-7.33	PNN	1345p	- 1390+rB	

# LABORATORY OF TREE-RING RESEARCH

## Archeological Date Report

Site Tijeras Pueblo--1974 Collection

Page 3 of 4

Accession Number Control Number 311-17 Date 9/10/75

Provenience	TRL Number	Field Number	Species	Dating		Remarks
				Inside	Outside	
Room 64 (Cont'd)	TJP-513	3A-7.12	PNN	1346p	- 1390+RB	
"	TJP-502	3A-7.41	PNN	1332p	- 1390+rGB	
"	TJP-475	4A-7.12	PP	1341p	- 1391vv	
"	TJP-488	4A-7.11	PP	1340p	- 1391r	
"	TJP-444	3A-7.25	PP	1345p	- 1391r	
"	TJP-458	3A-7.43	PP	1350p	- 1391r	
"	TJP-470	4A-7.8	PP	1351fp	- 1391r	
"	TJP-472	4A-7.57	PP	1353p	- 1391r	
"	TJP-451	3A-7.21	PP	1354p	- 1391r	
"	TJP-463	4A-N-7.13	PP	1354p	- 1391r	
"	TJP-453	3A-7.26	PP	1356p	- 1391r	
"	TJP-443	4A-7.63	PP	1357p	- 1391r	
"	TJP-473	4A-7.73	PP	1357p	- 1391r	
"	TJP-439	4A-7.54	PP	1358p	- 1391r	
"	TJP-447	4A-7.72	PP	1361p	- 1391r	
"	TJP-454	4A-N-7.19	PP	1361p	- 1391r	
"	TJP-464	4A-N-7.16	PP	1364p	- 1391r	
"	TJP-452	3A-7.9North	PP	1364p	- 1391r	
"	TJP-469	3A-7.14North	PP	1365p	- 1391r	
"	TJP-445	3A-7.4North	PP	1368p	- 1391r	
"	TJP-459	4A-7.34	PP	1369p	- 1391r	
"	TJP-471	4A-7.14	PP	1369p	- 1391r	
"	TJP-457	4A-7.27	PP	1370p	- 1391r	
"	TJP-436	4A-7.33	PP	1371p	- 1391r	
"	TJP-465	4A-7.35	PP	1371p	- 1391r	
"	TJP-455	4A-7.84	PP	1372p	- 1391r	
"	TJP-446	4A-7.16	PP	1373p	- 1391r	
"	TJP-462	4A-7.54	PP	1373p	- 1391r	
"	TJP-460	4A-N-7.15	PP	1378p	- 1391r	
"	TJP-461	4A-N-7.8	PP	1373p	- 1391c	
"	TJP-466	4A-7.64	PP	1353p	- 1391rB	
"	TJP-521	4A-N-7.6	PNN	1357p	- 1391rB	
"	TJP-440	4A-7.62	PP	1358p	- 1391rB	

## LABORATORY OF TREE-RING RESEARCH

## Archeological Date Report

Site Tijeras Pueblo--1974 Collection Page 4 of 4Accession Number  Control Number 311-17 Date 9/10/75

Provenience	TRL Number	Field Number	Species	Dating Inside	Outside	Remarks
Room 64 (Cont'd)	TJP-467	4A-7.52	PP	1363p	- 1391rB	
"	TJP-534	3A-7.31	PNN	1261p	- 1393v	
"	TJP-479	4A-7.79	PNN	1353p	- 1393c	
Room 101	TJP-577	2B-7.8	PNN	1320	- 1372vv	
"	TJP-574	2B-7.5	PNN	1353p	- 1391r	
"	TJP-575	2B-7.4	PNN	1364p	- 1391r	
Room 108	TJP-556	T1-4A-7.6	PP	1244p	- 1309+r	
"	TJP-555	T1-3A-7.1	PP	1245p	- 1310+r	
"	TJP-562	T2-4A-7.2	PP	1232p	- 1313r	
"	TJP-564	14 (?)	PP	1266p	- 1313r	
"	TJP-557	T1-4A-7.18	PP	1267p	- 1313r	
"	TJP-552	T1-4A-7.17	PP	1280p	- 1313r	
G.S. 20S/10W	TJP-583	T1-2B-7.2	PP	1230fp	- 1318vv	
"	TJP-584	T1-2B-7.1	PP	1203	- 1343++v	
"	TJP-591	T1-4A-7.6	PNN	1281p	- 1349+r	
"	TJP-581	T1-2B-7.1	PNN	1282p	- 1349+r	
"	TJP-582	T1-2B-7.9	PNN	1299p	- 1351r	
"	TJP-588	T1-3A-7.4	PP	1321p	- 1351r	
"	TJP-589	T1-3A-7.6	Fir	1322p	- 1351r	
G.S. 30S/100E	TJP-586	2B-7.3	PNN	1285	- 1351vv	
"	TJP-587	2B-7.4	PNN	1302fp	- 1351r	
G.S. 050S/120E	TJP-592	2C-T1-7.1	PNN	1327p	- 1353v	
G.S. 000S/120E	TJP-595	T1-2E-7.1	PNN	1367	- 1393r	
G.S. 000N/100E	TJP-596	2J-7.1	PNN	1228fp	- 1289+vv	
G.S. 20N/20W	TJP-598	T3-F1-7.1	PP	1272fp	- 1318vv	
No provenience	TJP-593	NE 7.10	PNN	1224p	- 1284r	

**Appendix B**

**Skeletal Remains from  
1975 Excavations**

by  
**Cheryl A. Ferguson**



Abstract

General observations of human remains from the 1975 excavation of Tijeras Pueblo are here presented, accompanied by detailed analysis of each individual and tables summarizing their principal attributes. This report, in conjunction with similar ones of earlier years (Rhine 1974 and Ferguson 1975), can provide a firm foundation for future problem-oriented studies. Suggestions for such research are offered in conclusion.

Dr. J. Stanley Rhine is gratefully acknowledged for his help, always of great value and willingly given.



Excavations during the summer of 1975 recovered 12 individuals, one-time inhabitants of Tijeras Pueblo, bringing the total number of human skeletons from the site to 36. This study of the 1975 burials found most of them in fairly good condition. Eight of 11 skulls (no portions of cranium or mandible remain from L.A. 581/30) suffered notable damage or loss, however, as did 6 post-cranial skeletons. Damage and loss are comparable to that found in most southwestern populations and previously recorded from the Tijeras excavation. Unless otherwise noted, breakage and damage of skeletal parts can be attributed to conditions of burial and of recovery. Four skeletons are those of infants from 1 to  $4\frac{1}{2}$  years of age. Six of the 8 adults, ranging in age from 19 to 40 years, are males, bringing the total recovered male population to 14. Only 9 females have been removed from the site (including the 2 of this season). The population was small of stature. Height estimates of the 8 adult skeletons range from 153.0 to 174.8 centimeters, or 61.2 to 69.9 inches (5'1" to 5'10"). Posterior cranial deformation from cradleboarding is characteristic. Skulls appear rather rugged and robust when compared to those of modern white populations. Prominent malars protrude outward and downward. There is no evidence of broken limbs. Violent deaths seem unlikely.

Three adults suffered pre-mortem tooth loss, a common problem of this population as a whole. Few caries and no abscesses were found, although such afflictions may have attributed to dental loss. Remaining teeth are considerably worn, as might be expected from a diet of ground meal and metate sand. Osteoarthritis, affecting 5 of the 8 adults present, is the most common pathology known at Tijeras. Also common are anomalies of the axial skeleton, which can be seen in 8 of these 12 individuals, infants and adults alike. Recent study (C. Garcia-Moral and S. Rhine, personal communication 1975) of such irregularities suggests a high frequency of mid-line disorders affecting several prehistoric populations of northern New Mexico. Definition of the condition and delimitation of its spatial and temporal boundaries await further study.

To obtain a degree of diachronic perspective of illness, proximal tibiae and distal femora of adult skeletons have undergone radiography in a search for Harris' lines. These lines are thin, transverse deposits of calcium compounds formed adjacent to the growth cartilage during a period of interrupted bone growth due to childhood illness or malnutrition. Thus, they record the number of severe deprivation events, but not the nature, of ill health suffered during the growing period (Wells 1967:390-391). Six of 8 adults possess

definite Harris' lines. Two of these, L.A. 581/31 and L.A. 581/37, display phenomenal numbers of them. Three complete and 13 fragmental lines appear upon tibiae and femora of L.A. 581/31, most of them on the right side. Thirty to 40 years of age at death, this man probably suffered considerable trauma during childhood. Such stress was perhaps a factor in the later loss of 9 teeth and his lesser stature, 5'1" to 5'4". L.A. 581/37, a male 25 to 35 years of age, possesses 5 complete Harris' lines and 8 line fragments on tibiae and femora. He, too, was a fairly short man, standing 5'2" to 5'5". Radiographs of 4 other individuals show each to possess at least 1 Harris' line. L.A. 581/30 shows 1 line upon the left femur. One, possibly 3, lines occur upon the left femur and tibia of L.A. 581/28. The left tibia and right femur of L.A. 581/35 possess 2 definite lines and 2 that are not as clear. L.A. 581/34 displays 4 lines on right tibia and both femora.

A total of 11 measurements were taken, whenever possible, on each skeleton. (See tables at conclusion of report.) Statures were calculated only from complete or easily restorable femora, according to a formula devised for Mongoloid populations by Trotter and Gleser (1958:120). Sex determination was based upon a galaxy of qualitative and quantitative observations, the latter of which include femoral dimensions, the ischio-pubic index, and, in one case, the Giles-Elliott formula. Relevant femoral dimensions include vertical head diameter and bicondylar width, both studied by Karl Pearson (1919: 56). Ischio-pubic lengths were measured using the method of Santiago Genoves (1959:109). Determination of sex from the index (pubic length/ischium length x 100) was based upon values recently derived specifically for prehistoric pueblo populations (Ferguson 1975b).<sup>1/</sup> In one case, L.A. 581/33, the Giles-Elliott formula (Olivier 1969:170-171) was used to affirm the determination of sex made from other characteristics. Assessment of sex for infants is difficult and unreliable, and was not attempted here. Ages of the little ones were taken from correspondences of femur, tibia, and humerus lengths with years of life as established by F. E. Johnston (1962:251). Adult age determination, as with that of sex, is the result of evaluation of numerous characteristics, including state of epiphyseal union, state of sutural obliteration, tooth loss, and degree of osteoarthritis. Facets of the pubic symphyses were used with fair success in age determination, as they corresponded to those described in an age series constructed by T. W. Todd (1920:301-314). A brief summary of the individuals and tables of their major qualitative and metrical characteristics follow.

L.A. 581/25=75.18.1

Miscellaneous

Excavation No. 1-030N/020W-2E-T6-B1

This "burial" is, in actuality, merely a miscellaneous assortment of bones removed from the ground in 1974 and misplaced until the 1975 season. Adult elements consist of one cervical and one thoracic vertebrae, one cranial fragment, one pedal phalanx, and four ribs. Two humeri and an occipital bone are those of infants. At least four, and probably more, individuals are represented. Three burials were removed from this grid in 1974. A 1 year old infant was taken from the 2K level, and two adults, a male 35 to 40 years of age and a 23 to 30 year-old female, came from the 2I level. This grid was not excavated fully, but sampled by means of several trenches, a method useful at that time to objectives concerned with the recovery of archeological "trash." This course of action, however, confused osteological material in that area of concentrated burials.

L.A. 581/26=75.18.2

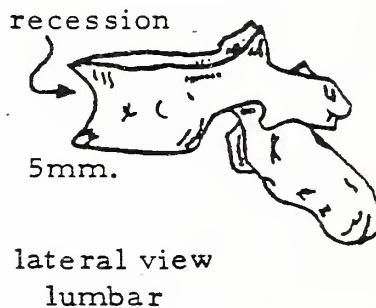
Adult Male (25-30 years)

Excavation No. 1-000N/100E-2I-T2-B2

Badly broken, the braincase of this individual is in fragments and partially missing, but the parietals are largely intact. Remaining portions of the frontal bone display supraorbital ridges near the midline. A button osteoma is immediately left of midline inside the frontal sinus. An ovoid nodule 10x6 millimeters in size, it has a smooth surface and an elevation of 2 millimeters. It is an interesting occurrence, the first such benign neoplasm noted from Tijeras, but most probably had no effect upon the man's life. The left malar and right side of the fairly deep palate are missing from the face. The mandible lacks its right condyle and is broken at the left  $P_2$ . Tooth wear is not great, but has broken into the dentin of all teeth present, except  $M_2^2$  and the premolars. It has just begun to wear through the enamel of  $M_1^1$ . The lower right lateral incisor is larger than the other lower incisors, all of which are present. Two millimeters higher than the occlusal plane, this unusual tooth has caused the premolar next to it (right  $P_1$ ) to wear on an angle, so that its crown is higher near the anomalous incisor than it is distally. Third molars are nonexistent in the mandible, but the upper left one is erupted. Because the maxilla has broken and is missing behind the right first molar, status of the right third molar is not known. It was not separately recovered, however, as was  $M_2^2$ .

Except for seven vertebrae and many elements of the hands and feet, the postcranial skeleton is mostly complete. It presents a curious problem in one aspect. All bones but one (tibia) of the left side are broken. In glaring contrast is the right side, on which only one bone (a rib) is broken. The individual was buried on his left side, but this fact alone cannot explain such dramatically differential breakage. Additionally, the underrepresentation of pedal elements (eight bones) is conspicuous in view that 45 elements remain from the hands. Speculative explanation, requiring knowledge of archeological context during recovery, is not here attempted.

One of the three lumbar vertebrae present possesses a small osteoarthritic growth, jutting forward 5 millimeters from the left lateral body surface. Slight lipping affects a second lumbar vertebra, but its most striking characteristic is a severe recession of the anterior centrum surface. Receding approximately 5 millimeters, the mid-anterior centrum appears to have been sucked inward, as shown below:



lateral view  
lumbar

All three vertebrae present from the lumbar region show lesser recessions of the inferior body surfaces upward. Such characters are of pathological significance, although their nature and origin are unknown.

Large knobs of extra bone growth occur upon the sacrum in a vertical line with the anterior sacral foramina, jutting outward for up to 5 millimeters above the regular sacral surface. A possible response to heavy musculature (the pyriformis muscle arises from the anterior sacrum), it may alternately be related to pathological malformations higher in the axis. Post-mortem erosion has taken the right articular surface.

In spite of slight erosion, an extra growth can also be seen upon the manubrium at the point of articulation with the left clavicle. This, most likely, is hypertrophy resulting from heavy arm musculature,

for the deltoid tuberosity of the humerus is quite sizeable. Interestingly, such musculature was probably combined with rather narrow shoulders, for the right clavicle measures only 14.0 centimeters in length. Both humeri have a slight anterior-posterior S-curve.

A possible, but faint, Harris' line appears in an X-ray of the left tibia.

A small erosion, 2x4 millimeters in size, lies upon the inferior surface of the talus at the point of contact with the sustentaculum tali of the calcaneus. It is very shallow, however, and did not affect the calcaneus. The right fifth metatarsal possesses small finger-like growths at its base upon the superior and medial sides. It is unfortunate that all other metatarsals are missing, for comparison is impossible. Perhaps this growth, too, is related to afflictions of the axial skeleton.

A dark red-purple stain, apparently the same as the one described in burials from 1974 excavations (Ferguson 1975a), affects this skeleton cranially and postcranially.

An ischio-pubic index of 89.1 definitely indicates this individual to be male, according to values recently determined specifically for prehistoric Indian populations of northern New Mexico (Ferguson 1975b). Indications of the index are supported by femoral dimensions and qualitative characteristics, a supra-orbital ridge, rounded eye orbits, a fairly deep palate, and a narrow sciatic notch. Open sutures and state of dental wear, combined with general appearance of the skeleton, including its lack of alveolar resorption and osteoarthritic afflictions, suggest an age at death of between 25 and 30 years of age. Stature calculations place his height at 159.5 to 167.1 centimeters, or 63.8 to 66.8 inches (5'3" to 5'7").

Excavators found the individual in a flexed position on his left side, skull to the east and facing south. Sherds, animal bones, and a corn cob were found in the interment pit, along with an obsidian blade and a drilled sherd. Three soil samples and flotation samples were taken as well.

L.A. 581/27=75.18.3

Infant (2½-3 years)

Excavation No. 1-020N/000W-2J-B1

Damaged by ground pressure and the excavation shovel, the cranium and mandible of this infant are badly broken. They are mostly complete, however, excavators having recovered even tiny bones of the inner ear. The tiny zygomatic bones possess double zygomatico-facial foramina. The second deciduous molars have erupted, and the first permanent molars have completed crown development in their sockets, though their roots are nonexistent.

Postcranially, this skeleton is in good condition, although partially missing. Only 15 neural arches are present, and there are 20 vertebral bodies. Also absent are portions of the sternum, one ischium, the right fibula, and the sacrum. Elements of the hands are surprisingly complete (all 10 metacarpals and 15 phalanges are present), but only 5 pedal components exist. Lacking the bones mentioned, it is unusual that all 20 remaining ribs have survived completely unbroken, in spite of their delicate nature, and that a coccygeal element was recovered.

Vertebral bodies are not yet fused with the arches. Halves of the neural arch of one cervical vertebra (three are present) have not fused, an event that should be complete by about the age of 2. Tibia and humerus lengths and stage of tooth eruption, however, suggest an age of 2.5 to 3 years. One transverse foramen of the atlas vertebra is not completely encircled by bone, and two lumbar vertebrae display extra bone growth in the form of a fold and a small protuberance superior to the inferior articular processes. Such growth is unusual for one of such tender age. It is unfortunate that more of the anomalous axial skeleton is not present in light of spinal column defects under present study and mentioned in the introduction.

Sherds, lithics, animal bones, and corn cobs, as well as three soil samples and flotation samples, were taken from the burial. The infant was found in a flexed position, its left arm by its side, its right arm under its stomach, and its head to the east, facing north.

L.A. 581/28=75.18.4

Adult Female (40 years)

Excavation No. 1-020N/000W-2N-B3

Complete and in very good condition, this skull has large mastoid processes, a slight supra-orbital ridge, and a very deep palate. The mandible is short from front to back and massive, with thick vertical rami and deep, thick horizontal rami. Very large mandibular tori extend on both sides along all teeth except incisors. This seemingly masculine skull is small, however, and the orbit edges are sharp. It is judged to be female. Sutures are almost completely closed; only barely traceable. Many teeth suffered pre-mortem loss (left  $M^3$  and right  $I^1$ ,  $P^2$ ,  $M^1$ ,  $M^3$  of the maxilla and left  $M_2$  and right  $M_1$ ,  $M_2$ ,  $M_3$  of the mandible). Resorption is extensive. It has, in fact, exposed the roots of all remaining teeth, upper to a greater extent than lower. Left  $M^1$  is held in place only by the very tip of its roots. The upper alveolar arch appears spongy distally, with open pits and extra growth, the results of bone remodeling. The arch is very thick, up to 18 millimeters at the cheek teeth, but there are no palatal tori. Dentin of the incisors is well exposed. Wear on upper molars has not yet broken through the enamel, but there are five caries on the three of them remaining. All lower teeth are very well worn, except left  $M_3$ , which erupted at an angle to the alveolus so that it leans inward. This position has resulted in a wear facet inclined to the normal occlusal surface. The molar, additionally, has a large and deep caries.

Mostly complete, the postcranial skeleton is in fairly good shape, but five long bones are broken or eroded at the ends. Most axial elements, including both innomates, are present and intact. Bones of the hands are better represented than are those of the feet, as is often the case.

The right foramen of the atlas vertebra was never encircled by bone. A gap 5 millimeters wide opens anteriorly, a situation not endangering health, but perhaps resulting in discomfort occasionally, for nerves may have slipped through the opening at times. (The left foramen has broken away, unfortunately, and is not present for comparison.) Cervicals six and seven display multiple transverse foramina. The sixth is affected bilaterally, the posterior foramina being smaller than the anterior ones. The anomaly appears upon only the right side of the seventh cervical, in which both foramina are of equal size. All lumbar and most thoracic vertebrae present are affected by slight osteoarthritic lipping,

which also can be seen upon the auricular surfaces of both innomates. Osteophytes occur around the articular surfaces of several thoracic vertebrae in areas of tendon and ligament attachment. The thoracic spine also shows slight asymmetry of spinous processes. Six appear to curve very slightly to the left, while one appears to lean slightly to the right. The possibility of scoliosis, or lateral curvature of the spine, exists; but the condition is so slight as to probably fall within the range of normal variability. A characteristic of the first lumbar is interesting to note, though probably not of health significance. Openings almost a centimeter in diameter appear upon the left and right sides of the centrum. The left one is connected by a canal to the venae basis vertebra, or posterior aperture through which veins pass from the centrum. It appears also to join with the cavity of the right side, so that a system of canals run through the vertebral body. Of more importance is a scar upon this vertebra, several millimeters in width and running medio-laterally across the superior surface of the centrum. It possibly marks the existence of a ruptured intervertebral disc.

Elements of the sacrum remain unfused, an unusual phenomenon in older people.

The left tibia possesses a single Harris' line. There may be two others upon the left femur.

Although the skull has many masculine characteristics, its small size, the small size of postcranial bones (including femoral dimensions), and the definitely feminine innomates indicate that this skeleton was that of a woman. The sciatic notches and the subpubic angle are wide. Pre-auricular sulci appear bilaterally, as do well-defined ventral arcs. Long pubes result in ischio-pubic indices of 101.5 and 106.5, both of which are far higher than the 98.2 value established as a maximum for prehistoric pueblo males. Her height probably ranged from 156.1 to 163.7 centimeters, or 62.4 to 65.5 inches (5'2" to 5'6").

Excavators found the skeleton in a flexed position, skull to the east and facing north. Large rocks were removed from direct contact with the arms and legs, revealing a substance, probably remains of flesh, attached to the bones. The bones were greasy at those points. Sherds, lithics, animal bones, soil and flotation samples, and samples of the above-mentioned substance were collected from the interment pit.

L.A. 581/29=75.18.5      Infant (12-18 months)

Excavation No. 1-020N/000W-2N-B4

Except for parts of the base, this skull is mostly complete and in good condition. The metopic suture is fused. Portions of the frontal, occipital, and parietals show an unusual affliction upon the inner table. It appears to be a type of complex, interfolding, pre-mortem erosion that has etched into the bone thickness, weaving in and out, back and forth, leaving only tiny islands of normal cranial bone depth. Cause or significance of this affliction is unknown.

The second deciduous molars were erupting at the time of this infant's death. Their root development is not complete. The crown of  $M_1$  was forming and can be seen within its socket.

The postcranial skeleton is mostly complete, except for elements of the hands and feet. It is in fair condition. Innominate and 20 of 24 ribs are complete, but many long bones are broken, splintered, or eroded. Femur, tibia, and humerus lengths suggest an age of 12 to 18 months, in agreement with the stage of tooth eruption.

Inconsonantly included in this burial was an adult navicular and patella, probably from one of the following, all of which were taken from the same grid: 75.18.4, an elderly female from the same level; 75.18.11, an adult male from one level below that containing the infant; or 75.18.12, also an adult male, but from one level above that with the infant. In addition, large mammal bones (including, interestingly, a mandible fragment from an immature deer), sherds, and lithics were removed from the grave. Soil and flotation samples were taken, along with a sample of a possible cradleboard buried with the infant, who was found in a flexed position, skull to the east and facing south.

L.A. 581/30=75.18.6      Young Adult Male (19-22 years)

Excavation No. 1-040S/020E-2A-T1-B1

No skull, mandible, or fragments of either were present in this burial. The atlas vertebra was also not recovered. The axis is present, however, contrary to excavation records. It, along with carpals, a metacarpal, and a phalanx, were recovered with the bones of an infant, 75.18.8, which lay  $\frac{1}{2}$  foot below this young man. Cervicals three and four were not in line with the others. Excavation

records indicate them to be approximately 8 inches from their expected positions. The young man was found about 6 inches above the bedrock which underlies the site. He was slightly below what is now believed to have been a plaza during the latest period of occupation. Careful scrutiny of the complete axis vertebra revealed no evidence of cuts or blows.

Remainder of the postcranial skeleton is largely complete and in fairly good condition. Innominate are complete and sturdy. Several long bones and ribs are broken, however, and the left scapula is represented only by fragments. Four vertebrae have suffered diagonal cuts across the centra, probably from events of excavation. Differential breakage and erosion indicate the young man to have been lying upon his right side.

A slight medio-lateral S-curve is seen in the left tibia. The right one bows slightly anter-posteriorly. A single Harris' line appears upon the left femur. Appearance of the pubic facets and stage of epiphyseal union of long bones, clavicles, and vertebrae, as well as degree of union of vertebral and sacral elements, suggest an age of 19 to 22 years. The narrow sciatic notch and sub-pubic angle reveal his masculinity. Ischio-pubic indices, however, are not useful in this case. They are 92.4 and 91.6, both within the overlap range between male and female, a situation which might have changed had the individual lived a few years longer. Femoral length suggests a height of 155.4 to 163.0 centimeters, or 62.2 to 65.2 inches (5'2" to 5'5").

The individual was found in a flexed position, oriented in an easterly direction. As mentioned earlier, differential breakage and erosion indicate that he lay upon his right side. Large and small mammal bones and three soil samples were also taken from the burial.

L.A. 581/31=75.18.7      Adult Male (30-40 years)

Excavation No. 1-030N/080E-1A-T1-B1

The skull of this individual is severely damaged and partially missing. Bones of the orbits and the base and posterior portions of the brain-case have broken away and were not recovered. The left temporal has been detached by ground pressure. There is a hole in the posterior left parietal and considerable breakage of the posterior right parietal occurred during excavation. Amazingly, the destruction of time and removal has spared both delicate styloid processes. The cranium

displays a high forehead with superciliary ridges and large mastoid processes. Temporal lines cannot be seen. Sutures have begun to close. The coronal cannot be seen upon the inner table, but, except for a few sections, is clear from the outside. Several sections of the sagittal are obliterated, but it can be traced. The lambdoidal suture was unfused, for it allowed separation of the occipital bone. Sutures of the pterion regions are completely obliterated. An interesting asymmetry is displayed by several cranial characters. The right orbit is larger in breadth than the left by 2.5 millimeters, a difference noticeable without metric aids. The mastoid process of the right side is 6 millimeters longer than that of the left. Styloid processes show a size differential also (4 millimeters), but here the left is the longer.

Right  $M^1$ ,  $M^3$ , and left  $M^2$  were lost before death, as were all mandibular molars. Right  $M^1$  was the first of upper teeth to be lost, and subsequent mesial drift of right  $M^2$  has caused it to lean slightly forward. Advanced resorption has exposed the roots of all remaining upper molars. Occlusal surfaces of left  $M^1$  and  $M^2$  are in a lower plane than are premolars and anterior teeth. Wear upon  $M^1$  thus is greater mesially and angles upward to  $P^2$ . Wear has just broken through the enamel of  $M^2$ . Wear of anterior teeth is fairly heavy. Right  $M^2$  shows only slight wear, for it had nothing with which to occlude, all mandibular molars being lost pre-mortem. Right  $M_1$  was the last of lower teeth to go, preceded by right  $M_3$ . The area of the lost molars has almost completely remodeled itself. Wear has broken through the enamel of all remaining teeth, but not extensively. Considerable tarter yet clings to incisors and canines. Right  $C_1$  is slightly rotated to the right. For reasons of differential tooth wear and time of tooth loss, the two third molars included with this burial probably do not belong with it. An adult female, 75.18.10, was recovered from the same grid, less than 1 foot below the level of this male. Her well-worn teeth do not match these loose ones either, however, and she appears never to have had third molars.

The postcranial skeleton is surprisingly complete. (Most elements of the hands and feet are present, in fact.) It is in good condition in spite of erosion affecting the right ilium, both scapulae, and several vertebrae. Osteoarthritis has slightly affected centra, articular surfaces, and spinous processes of several thoracic and lumbar vertebrae. Exostoses upon the manubrium are most probably not pathological, but rather the response to massive musculature, for each humerus exhibits a large ridge to which attach the external

head of the triceps muscle. Pitting and exostoses can be seen upon both third cuneiforms below the surface of articulation with the third metatarsal, which, likewise, is marred by the same condition. The corresponding metatarsal of the other side is missing, not available for comparison. Terminal phalanges of the first pedal digits display a slight flaring and extra growth. Two phalanges of other toes also show extra growth distally. It is difficult to determine whether such growth upon bones of the feet is of pathological significance or simply a response to injury.

Small ovals of pre-mortem erosion approximately 13x7 millimeters in size appear posteriorly upon the lateral condyles of both femora. They are very shallow, affecting only the outer bone surface and exposing the fine structure. In extreme flexion, they would contact the articular surfaces of the tibiae, upon which there is no sign of abnormality. Radiographs of long bones show this man to have the greatest number of Harris' lines of any skeleton tested for the condition. Femora possess six, and tibiae displayed ten. Ten of the total 16 lie upon the right side. Childhood trauma, whether of disease, illness, or malnutrition, must have been severe and perhaps played a part in later tooth loss and lesser stature (5'1" to 5'4").

Pre-mortem erosion upon the anterior area of the pubic symphysis has resulted in a cheesecloth appearance, with a bony network of large cavity-like interstices.

Skull characteristics, femoral dimensions, a narrow sciatic notch, and ischio-pubic indices of 84.9 and 85.2 clearly display the masculinity of this individual. He was short, it seems, probably from 153.1 to 160.7 centimeters, or 61.2 to 64.3 inches (5'1" to 5'4") in height. Advanced suture closure, stage of resorption, presence of osteoarthritis and exostoses, and appearance of facets of the pubic symphyses suggest an age of 30 to 40 years.

The man was buried on his back with his knees flexed and pointed upward. His head was oriented east, facing west. Sherds, lithics, animal bone, soil and flotation samples, a bead blank (from the neck region), and two shells were also taken in excavation.

L.A. 581/32=75.18.8      Infant (3 $\frac{1}{2}$ -4 $\frac{1}{2}$  years)

Excavation No. 1-040S/020E-2C-T1-B2

Ground pressure and excavation errors have severely damaged the skull of this infant. Much of it is in fragments. It is, however, largely complete. The metopic suture has not completely closed inferiorly. Though unfused, the highly interwoven lambdoidal suture yet holds the occipital and left parietal together. The cranium is unusually large for an infant of 4 $\frac{1}{2}$  years. The possibility of hydrocephaly surfaces in conjunction with the possible central nervous system disorder enumerated below. First permanent molars can be seen forming in their sockets. Both deciduous first molars have considerable wear, which has begun to break through the enamel.

Much of the postcranial skeleton is missing, as the excavators noted. Only 17 vertebrae, 1 scapula, 1 ischium, both clavicles, the corpus sterni, 16 ribs, the right humerus, a carpal, and 5 phalanges remain. Their fairly good condition increases the mystery shrouding absence of so many bones, for it is indeed strange that a few should survive so well, while so many would not be present at all.

All 7 cervical vertebrae are present. The neural arches of 4 of them remain in 2 portions, although fusion should have been completed early in the second year. An age at death of 3 $\frac{1}{2}$  to 4 $\frac{1}{2}$  years is suggested, however, by length of the right humerus, fusion of occipital elements, and stage of tooth eruption. Such latency of the fusion process has been recently noted in other populations of prehistoric pueblo Indians (C. Garcia-Moral and S. Rhine, personal communication 1975). This particular condition is suspected to evince the presence of a central nervous system disorder, probably a fatal one, for it is found only in infant skeletons. It greatly resembles the affliction known to modern industrial populations as spina bifida occulta, in which the spinal cord is left unprotected by incompletely formed vertebrae. In this light, the unusually large cranium becomes suspect, for it might suggest an accompanying hydrocephalic condition (S. Rhine, personal communication 1976). Certainty of the pathology's nature awaits further study.

Found upon a bed of rocks with stones surrounding it, the infant's head was directed east and facing south.

L.A. 581/33=75.18.10

Adult Female (25-35 years)

Excavation No. 1-030N/080E-2A-T1-B2

Although lacking a sizeable portion of the left side of the braincase, this skull is yet in fairly good condition. All sutures are easily traced. Cradleboard deformation is high and to the right, so as not to be noticeable from a left lateral view. Nuchal musculature is well-marked, and the external occipital protuberance is so great as to form an "occipital bun." Thick mastoid processes, a supra-orbital ridge, and deep palate display the robustness of this individual. Orbita are rectangular with rounded edges. A glance at the profile reveals its considerable alveolar prognathism. The massive mandible has eroded away posteriorly to the left second molar. Erosion of the outer bone surface from right  $P^1$  to left  $M_2$  reveals the inner bone structure and roots of all teeth involved. The medial portion of the arch of this mandible displays the most massive tori yet seen in this population. Teeth are greatly worn, and dentin is exposed. Tarter buildup is considerable and especially noticeable upon anterior teeth. Left  $C^1$  is rotated slightly outward. Large caries affect left  $I^1$  and right  $M_2$ . With the possible exception of left  $M_3$ , third molars appear to be non-existent.

If sex of this individual were to be determined solely by qualitative characteristics of the skull, it would undoubtedly be labeled as male. Its dimensions, however, when used in the Giles-Elliott formula (Olivier 1969:170-171) mentioned earlier, yield a value considerably below that maximum believed to incorporate 80 percent of females. Study of the postcranial skeleton also reveals a feminine character. The very wide sciatic notches and sub-pubic angle are complemented by unusually large pre-auricular sulci. Femoral dimensions are also unquestionably female. The sacrum is short and wide. This unusual skeleton, then, displays the extremes in characteristics of both sexes.

Most postcranial locations are represented, but bones are badly broken and eroded. Vertebrae, ribs, scapulae, and sternum are mostly complete, but innominate are partially broken. Breakage affected half of the long bones, none of which possess Harris' lines. Feet are better represented than are elements of the hands. The skeleton is small but robust. Humeri show large muscle attachments. Slight osteoarthritic lipping affects three, possibly four, lumbar vertebrae. Four cervical vertebrae possess large

double spinous processes. One cervical shows an asymmetry in that bone growth extends laterally beyond the left transverse foramen for a length of 1 to  $1\frac{1}{2}$  centimeters greater than does corresponding bone of the opposite side. Such an anomaly probably was of no significance to health.

Degree of suture closure, tooth wear, and osteoarthritis, as well as general appearance of the skeleton, suggest an age of 25 to 35 years. Calculations with an estimated femur length suggest a height of from 153.0 to 160.7 centimeters, or 61.2 to 64.3 inches (5'1" to 5'4").

Found flexed with head toward the east and facing south, the woman was lying chest down upon her left arm. The right arm lay flexed and to her side. Shards, lithics, animal bones, a point, and a fetish were taken along with soil and flotation samples.

L.A. 581/34=75.18.11      Adult Male (25-35 years)

Excavation No. 1-020N/000W-20-B5

Fragmented and with several recent breaks, this skull is in poor condition. Fragments represent all areas of the cranium however. A large portion of the occipital bone with parietals shows a lambdoidal suture which is highly inter-digitated, easily traceable, and very wide. The unusual coronal suture displays an inter-digitating pattern only upon the inner table. Its outer side is smooth and gently meandering, rather like the edges of a child's puzzle pieces. It, too, is easily traceable on either side, as is the sagittal suture. The large, wide face possesses rounded orbit edges. A deep palate, large mastoid processes, and large supra-orbital ridges intensify a robust appearance. The mandible is complete except for right gonion. A slight extra growth of bone extends anteriorly from the left coronoid process, but is probably of little significance beyond curiosity. There appears never to have been space adequate for the eruption of third molars. Slight wear has begun to break through the enamel of first molars.  $M^2$  has been in occlusion only long enough to show polish and wear facets. Dental anomalies are limited to an upper central incisor, which has rotated inward nearly  $45^\circ$ .

Many postcranial bones are fragmented. Not a complete rib, vertebra, scapula, or innominate is present from the axial skeleton. Half of the long bones are broken or damaged. Hands and feet are represented sparsely and only by fragments. Although the skull

appears robust, the postcranial skeleton was not overly so. Appearance of the corpus sterni seems worthy of quick mention, for it flares inferiorly, taking the shape of a teardrop, and possesses a large foramen. Additionally, four Harris' lines are shown by three bones of the legs, revealing childhood trauma of unknown nature.

Although third molars are not present, the absence of traces of epiphyseal lines reveals an age of greater than 25. Sutures are yet open, teeth are not greatly worn, and no signs of osteoarthritis are evident. The individual is probably not greater than 35 years of age. The robust skull suggests maleness, with its sizeable supraorbital ridges and mastoid processes, rounded orbit edges, and deep palate. Sciatic notches are narrow. The man probably stood between 159.7 and 167.7 centimeters, or 63.9 to 67.1 inches (5'4" to 5'7").

Excavators found the skeleton flexed, skull to the east and facing west. Sherds, lithics, animal bone, and a polishing stone were collected from the burial. Additionally, excavators gathered five soil samples, flotation samples, and samples of a possible fiber matter and yellow soil present with the skeleton.

L.A. 581/35=75.18.12      Adult Male (25-30 years)

Excavation No. 1-020N/000W-2M-B2

Although the skull is mostly complete and in fairly good condition, its base and most of the occipital bone have broken away and are missing. The red-purple stain, noticed and described before in bones of this population (Ferguson 1975a), appears upon the inner cranial table. Asymmetrical cradleboard deformation is high and to the right, so that it is not even noticeable in a left lateral view. Sutures are clearly traceable, inside and out. There appears to be no right parietal foramen, and the temporal line is not at all an obvious one. So prominent is the glabellar region, however, that small depressions nestle above it and to either side of the mid-line. The face is large, wide, and long. It has been displaced upwards and laterally to the left by ground pressure. Protruding nasal bones top a relatively narrow nasal aperture. The palate is deep. As might be expected, the mandible is massive. It lacks the left ascending ramus and the right gonion. Left  $M_2$  was lost before death and left  $M_3$  was lost post-mortem, but all other teeth are in place. Alveolar resorption is moderate, however, and tartar

clings to the shovelled incisors. Right  $P_2^2$  suffered erosion during life, breaking after death. Right  $M_2^3$  and  $M_3^3$  have large and deep caries. Lower third molars are unusually large.

Excepting the axial skeleton, this individual is mostly complete postcranially. Only half of the vertebral column is present, however, and much of it is in fragments, as are most bones of the shoulder and pelvic girdles. All long bones are present, but many are broken or damaged. Feet are more adequately represented than are elements of the hands.

Bones of the axial skeleton present several anomalies. Each one of them, considered alone, could be discounted as merely a character of interest. Taken together, however, the complex may suggest a possible systemic disorder. Most serious of these anomalies involves the atlas vertebra, which is completely fused to the base of the skull. Fusion of the axis and third cervical vertebrae is also complete. The dens epistrophei is smaller than that normally seen upon C2. Asymmetry of articular surfaces of the axis vertebra and position of the atlas upon the skull suggest a permanent flexion of the neck. In this situation, the head would probably have faced constantly upwards to a slight degree, unless a compensating anteriorly concave curve existed in the lower cervical region. Besides restricting vertical head movement, the double fusion restricted horizontal rotation to the contact between atlas and to joints below the third cervical vertebra. Unfortunately, no vertebrae from that area are present for study.

Several lesser axial anomalies deserve mention, especially in light of the previously mentioned possible spinal column pathology complex. Fusion appears once more, but this time in the thoracic region, in which two badly fragmented vertebrae appear to merge along their neural arches. Additionally, several elements of the sacrum remain unfused in spite of mature age. The neural canal is open posteriorly from S3, which is unusually high. The asymmetrical manubrium slants upward to the left at its base and possesses a foramen inferiorly.

The left tibia and right femur each possess a Harris' line, and there exists a possibility of two more. The postcranial skeleton is large, and limb bones are long compared to others of this population. In life, the man stood relatively tall, approximately 166.8 to 174.8 centimeters, or 66.7 to 69.9 inches (5'7" to 5'10"). Narrow sciatic notches, a great glabellar protrusion, deep palate,

greater femoral dimensions, and generally large skeletal size proclaim his masculinity. Appearance of the pubic symphyses, completion of epiphyseal fusion, absence of osteoarthritic signs, and general appearances suggest an age of 25 to 30 years at death.

The individual was found in the usual position, flexed, with skull to the east. The face was directed downward. Shards, lithics, animal bones, and soil and flotation samples were taken from the burial.

L.A. 581/36=75.18.13      Infant (3 years)

Excavation No. 1-020N/000W-20-B6

The left parietal bone of the infant's cranium was broken in excavation, but the braincase is in fair condition and mostly complete. The mandible was in two pieces having been broken at the right canine. A portion of the metopic suture is noticeable inferiorly. The superior surface of the orbits possesses a porosity that might, were it more pronounced, be considered cibra orbitalia. It is not, however, that extreme. Also somewhat unusual is a shallow oval depression, approximately 2x1.2 centimeters, upon the mid-exterior of the occipital bone. It appears to be an impression, as if the soft bone were altered by pressures. A protuberance upon a cradleboard might, for instance, provide such pressure.

Postcranially, the infant is mostly complete, although it, not surprisingly, lacks most elements of the hands and feet. Almost every axial element is present and whole. All long bones are also present and in very good condition. Of interest are the incompletely closed transverse foramina of the atlas vertebra. Additionally, neural arches of cervical vertebrae remain unfused, a hint of the aforementioned spinal column disorder. Fusion of neural arches should be complete early in the second year.

Lengths of femora, tibiae, and humeri indicate an age of 3 years. Second deciduous molars have erupted, and first permanent molars can be seen in their sockets, a situation in concordance with the long bone age determination.

The little body was flexed for burial and oriented east, facing west. An adult pedal phalanx is included with the skeleton and belongs, probably, to one of the three adults also recovered from this grid (75.18.4, 75.18.11, 75.18.12). Lithics, animal bones, and soil and flotation samples were collected in the course of excavation.

L. A. 581/37=75.18.14

Adult Male (25-35 years)

Excavation No. 1-050N/040E-2E and 2F-T2-B1

Severe damage has been inflicted upon this skull by ground pressure. It is broken and the base is largely missing. The vault is present, but has been pushed inward. Except for fragments of maxilla no more than 4.1 centimeters long and bearing cheek teeth, the face has been lost. A similar fate has taken a section of the right ascending ramus of the mandible, which has, itself, broken behind the left lateral incisor.

Asymmetrical cranial deformation is high and to the left. Obliteration has begun at both ends of the coronal suture; the frontonasal suture has completely closed. An unusual red-brown stain appears upon the inner table of the skull, from the petrous portion of the temporal bone backward and upward along the right side of the thick braincase. Origin is unknown, but it lends the impression of residue left from a pool of liquid, for its boundary is the constant line of a circle imposed upon the sphere of the skull vault. Excavation records show that the man was buried upon his right side, so that the stained side would have been downward. Interestingly, the size and number of meningeal arteries may be slightly greater upon that side than are those of the left. Implications of this situation should be made only with caution until chemical studies have been undertaken. Dental wear is fair, having just broken into the dentin of all teeth. Although most of the face has been lost, all upper teeth are present, as are those of the mandible. Additionally, there are an inconsonant deciduous incisor and a peg tooth that retains no enamel. One tooth, perhaps a premolar from the upper left side, is worn much more than the others. Abrasion has been asymmetrical, and it is worn to a greater extent lingually (almost to the gumline) than buccally. Such wear might result from use of the tooth as a tool. If indeed it is an upper premolar, one might suggest that an object had been recurrently drawn downward against it. Occlusal surfaces of central incisors, upper and lower, are worn at an angle, indicating that they probably were rotated slightly within their sockets. Right C<sub>1</sub> can be seen to be rotated 90° clockwise. Left M<sub>3</sub> is impacted, its occlusal surface directed toward the second molar.

Mostly complete except for elements of the hands and feet, the postcranial skeleton has suffered some breakage. Innominate are fragmented and several vertebrae are missing. Sacral elements remain unfused although the individual is certainly mature. Ribs and rib

fragments are numerous, representing more than belonged to this man. Many long bones are broken, and portions of them are not to be found. Pedal phalanges are completely absent, an unusual condition.

The skeleton indicates a robustness, for muscle attachments are fairly large. Slight osteoarthritic lipping lies upon the border of the left acetabulum, but no growth is seen upon the corresponding femur. Especially interesting is the presence of four fragments of bone, none of which is more than 3.5 centimeters at its largest dimension. Each has suffered destruction of the outer bone table and is very thin with an eroded, irregular, pock-marked, granular appearance, rather like sesame-seed wafers. An infectious inflammation is probably responsible, but no other bones show signs of such an affliction. The fragments appear to be those of scapulae, but both scapulae of this individual are present in part and show no irregularity. They may represent another burial.

A squatting facet appears inferiorly upon the right tibia. Bones of the legs show an unusual number of Harris' lines. Thirteen appear upon femora and tibiae. They are fairly evenly distributed as to side. This individual is the second of those recovered this season to show evidence of severe childhood traumata, although others possessed the transverse lines to a lesser extent. Such trauma is perhaps a factor in the man's lesser stature (5'2" to 5'5").

Facets of the pubic symphysis suggest an age of 25 to 35 years, which is not at odds with stage of sutural fusion or general skeletal appearance. The robust and muscular skeleton is that of a male, as is the narrow sub-pubic angle. Sciatic notches are fairly wide for a male. The skull vault is thick. His stature is estimated to have been between 155.0 and 163.4 centimeters, or 62.0 to 65.4 inches (5'2" to 5'5").

The man was found upon his right side, flexed, with skull oriented east and facing north. Excavators noted a huge stone covering the "pelvis and rib area." Animal bone fragments, sherds, lithics, corn cobs, a shell, and an obsidian point accompanied the burial. Three pollen, three soil, and flotation samples were also taken.

Presently, 36 human skeletons, 24 of which are adults, have been recovered from Tijeras Pueblo and described (Rhine 1974 and Ferguson 1975a). Considering the site size, it is rather surprising that more human remains were not uncovered. Results would prove most useful were future research directed, as much as possible within its present orientation, toward the recovery of more skeletons. The present sample population has only begun to reach a minimal size lending itself to statistical techniques which could greatly further archeological interpretation.

Present plans call for a comprehensive accumulation of characters, metrical and nonmetrical. More definitely defined research problems will spring from such description. The Tijeras population might be compared, for instance, with people from pueblos of other places and/or times, whether belonging to the same general cultural entity or to one culturally different. In either case, careful and detailed assessment of physical similarities and differences would lead to inferences concerning a population's mobility and marriage practices, among other aspects of social organization and questions of genetic interest. It might also allow speculation of ecological variables present and their comparative effects upon the respective populations.

Radiographs have been made of femora and tibiae of 14 of the 24 adults present. Completion of radiographs for the present collection, together with those of the larger sample anticipated in future years, will form a valuable reference applicable to the Tijeras research problem. Determination of an individual's approximate age at the time of each line's formation might suggest periods of environmental stress or infectious disease by which many people were affected. A problem inherent in such an effort would be that of correlation of each skeleton with its appropriate occupational level, a practical problem made difficult by the scarcity of grave goods. A second problem lies with the radiographic method itself, for it is impossible at present to interpret the nature of a pathological process from the Harris' lines it forms. Thus, a line due to short illness cannot be distinguished from that formed by lengthy famine (Wells 1967:393). Also intriguing, though, is the possibility of speculation concerning social values and organization. For instance, a difference between the sexes in Harris' line number and ages at formation might be expected if males and females were subjected to differential treatment affecting their diets in kind or amount (Wells 1967:395-396). Such a situation would expectably be more noticeable during times of environmental stress.

Evidence of a central nervous system disorder<sup>2/</sup> among inhabitants of Tijeras Pueblo provides the possibility for intriguing paleopathological research of a nature not often attempted with prehistoric pueblo populations. Adults show a rather general, as yet unknown, affliction evinced by numerable axial anomalies. Infants display irregularity of vertebral fusion, a hint, perhaps of such pathologies as spina bifida (C. Garcia-Moral and S. Rhine, personal communication 1975), a condition afflicting modern industrial populations as well. Many questions of pathology remain as yet unanswered.

The generally good condition of Tijeras material should lend the population to many other future inquiries, including those concerning more than this one population. To date, osteometric research suggested within the skeletal report of 1974 excavations (Ferguson 1975a: 39) has been undertaken (Ferguson 1975b). Tijeras is one of several Anasazi groups providing the sample for establishment of ischio-pubic index values more appropriate for Anasazi sex differentiation than are those existing for white populations. The newly determined values were used successfully for sex determination in the present study, as noted within introductory paragraphs.

Table 4

Summary of Major Skeletal Characteristics

<u>Burial No.</u>	<u>Accession No.</u>	<u>Excavation No.</u>	<u>Sex</u>	<u>Age</u>	<u>Stature</u>
LA 581/25	75.18.1	1-030N/020W-2E-T6-B1	Miscellaneous	--	
LA 581/26	75.18.2	1-000N/100E-2I-T2-B2	Male	25-30	159.5-167.1cm (63.8-66.8") 5'3"-5'7"
LA 581/27	75.18.3	1-020N/000W-2J-B1	--	2½-3	--
LA 581/28	75.18.4	1-020N/000W-2N-B3	Female	40	156.1-163.7cm (62.4-65.5") 5'2"-5'6"
LA 581/29	75.18.5	1-020N/000W-2N-B4	--	1-1½	--
LA 581/30	75.18.6	1-040S/020E-2A-T1-B1	Male	19-22	155.4-163.0cm (62.2-65.2") 5'2"-5'5"
LA 581/31	75.18.7	1-030N/080E-1A-T1-B1	Male	30-40	153.1-160.7cm (61.2-64.3") 5'1"-5'4"
LA 581/32	75.18.8	1-040S/020E-2C-T1-B2	--	3½-4½	--
LA 581/33	75.18.10	1-030N/080E-2A-T1-B2	Female	25-35	153.0-160.7cm (61.2-64.3") 5'1"-5'4"
LA 581/34	75.18.11	1-020N/000W-2O-B5	Male	25-35	159.7-167.7cm (63.9-67.1") 5'4"-5'7"
LA 581/35	75.18.12	1-020N/000W-2M-B2	Male	25-30	166.8-174.8cm (66.7-69.9") 5'7"-5'10"
LA 581/36	75.18.13	1-020N/000W-2O-B6	--	3	--
LA 581/37	75.18.14	1-050N/040E-2E&2F-T2-B1	Male	25-35	155.0-163.4cm (62.0-65.4") 5'2"-5'5"

Table 4 (Continued)

Summary of Major Skeletal Characteristics

<u>Burial No.</u>	<u>Condition and Material Recovered</u>	<u>Femur Length (cm)</u>
LA 581/25	Good; miscellaneous from several burials	--
LA 581/26	PC mostly complete and in fairly good condition; skull fragmented and partially missing	42.2 right
LA 581/27	PC good, partially missing; skull broken but mostly complete	--
LA 581/28	PC fairly good, mostly complete; skull good, complete	40.6 right
LA 581/29	PC fair, mostly complete; skull good, mostly complete	12.8 right
LA 581/30	PC fairly good, mostly complete; no skull	40.3 left
LA 581/31	PC good, mostly complete; skull severely damaged and partially missing	39.2 left
LA 581/32	PC fairly good, largely missing; skull severely damaged but mostly complete	39.2 right
LA 581/33	PC badly broken and eroded, but mostly complete; skull fairly good, partially missing	39.2 (est.) right
LA 581/34	PC poor and fragmented, largely missing; skull poor and fragmented, partially missing	42.3 left
LA 581/35	PC badly broken, mostly complete except axial; skull fairly good, but partially missing	42.5 right
LA 581/36	PC good, mostly complete; skull fair, mostly complete	45.8 left
LA 581/37	PC considerable breakage, mostly complete except hands and feet; skull severely damaged and partially missing	45.6 right
		16.2 left
		15.8 (est.) right
		40.5 left
		40.1 right

Table 4 (Continued)

## Summary of Major Skeletal Characteristics

<u>Burial No.</u>	<u>Vertical Diameter of Femur Head (mm)</u>	<u>Bicondylar Width of Femur (mm)</u>	<u>Pubis Length (mm)</u>	<u>Ischium Length (mm)</u>	<u>Ischio- Pubic Index</u>
LA 581/25	--	--	--	--	--
LA 581/26	47.0 right	80.0 left 82.0 right	82.0 right	92.0 right	89.1 right
LA 581/27	--	--	--	--	--
LA 581/28	40.0 left 39.0 right	--	83.8 left 86.8 (est.) right	82.6 left 81.5 right	101.5 left 106.5 (est.) right
LA 581/29	--	--	--	--	--
LA 581/30	42.0 left 41.0 right	--	75.5 left 73.1 right	81.7 left 79.7 right	92.4 left 91.6 right
LA 581/31	44.0 left 44.0 right	79.0 left 78.0 right	75.0 left 75.3 right	88.3 left 88.4 right	84.9 left 85.2 right
LA 581/32	--	--	--	--	--
LA 581/33	40.0 (est.) left 43.0 right	69.0 right 77.0 right	--	--	--
LA 581/34	44.0 left	79.0 left	--	--	--
LA 581/35	44.0 right	79.0 right	--	--	--
LA 581/36	--	--	--	--	--
LA 581/37	41.5 left 43.0 right	76.0 right	--	--	--

Table 4 (Continued)

## Summary of Major Skeletal Characteristics

<u>Burial No.</u>	<u>Cranial Length (cm)</u>	<u>Cranial Width (cm)</u>	<u>Cranial Height (cm)</u>	<u>Bizygomatic Width (cm)</u>	<u>Tibia Length (cm)</u>	<u>Humerus Length (cm)</u>
LA 581/25	--	--	--	--	--	--
LA 581/26	--	--	--	--	36.8 right	30.6 right
LA 581/27	--	--	--	--	13.2 left	12.0 left
LA 581/28	17.0	15.0	13.8	12.2 (est.)	35.0 (est.)	12.0 right
LA 581/29	--	--	--	--	35.0 (est.)	29.4 left
LA 581/30	--	--	--	--	35.0 (est.)	29.4 left
LA 581/31	--	--	--	--	35.0 (est.)	29.4 left
LA 581/32	--	--	--	--	35.0 (est.)	29.4 left
LA 581/33	17.4	--	13.5	13.2 (est.)	35.0 (est.)	29.4 left
LA 581/34	--	--	--	--	35.0 (est.)	29.4 left
LA 581/35	15.8	14.6	--	--	35.0 (est.)	29.4 left
LA 581/36	--	--	--	--	35.0 (est.)	29.4 left
LA 581/37	--	--	--	--	35.0 (est.)	29.4 left

### References

Ferguson, Cheryl A.

1975a Appendix P: Skeletal Remains from 1974 Excavations,  
in The 1974 Excavations of Tijeras Pueblo, Linda S.  
Cordell, USDA Forest Service, Southwestern Region,  
No. 5, pp. 29-44.

1975b The Ischio-Pubic Index: Comparison and Critique of  
Methods, and Determination of Values for Prehistoric  
Pueblo Indians, unpublished manuscript.

Genoves, Santiago Tarazaga

1959 Diferencias Sexuales en el Hueso Coxal, Universidad de  
Mexico.

Johnston, Francis E.

1962 Growth of the Long Bones of Infants and Young Children  
at Indian Knoll. American Journal of Physical Anthro-  
pology, vol. 20, pp. 249-254.

Olivier, Georges

1969 Practical Anthropology, Charles C. Thomas, Illinois

Pearson, Karl

1917-1919 A Study of the Long Bones of the English Skeleton I:  
The Femur. Draper's Company Research Memoirs,  
Department of Applied Statistics, University of London,  
Biometric Series X, chap. 1-4.

Rhine, J. Stanley

1974 Human Remains from the Tijeras Pueblo; Appendix  
"G" to The Excavation of Tijeras Pueblo by W. James  
Judge, USDA Forest Service, Southwestern Region,  
No. 3.

1975 Personal communication.

Todd, T. Wingate

1920 Age Changes in the Pubic Bone, I: The Male White  
Pubis. American Journal of Physical Anthropology,  
vol. 3, pp. 285-334.

Trotter, Mildred and Goldine C. Gleser  
1958      A Re-evaluation of Estimation of Stature Based on  
Measurements of Stature Taken During Life and of  
Long Bones After Death. American Journal of  
Physical Anthropology, vol. (NS) 16, pp. 79-123.

Wells, Calvin  
1967      A New Approach to Palaeopathology: Harris's Lines,  
in Diseases in Antiquity. Don Brothwell, ed.,  
Charles C. Thomas, Illinois.

Appendix C

Teaching Assistant  
Report 1975 Season

by  
Gregory C. Burtchard



During the 1975 field season, the crews in Group II concentrated on the delineation of the architectural sequence of Room Block II and excavation of a trash profile south of Block V. This was largely an extension of work done in Room Block I during the 1974 season. In Block I, we had identified a sequence of two temporally distinct occupations. On the basis of such a limited area, however, it could not adequately be determined whether the pattern was general to the site or merely reflected partial abandonment of that section of the pueblo. We hoped to further examine the sequence and determine the extent of the associated structural units.<sup>3/</sup>

Procedures undertaken during 1975 include the mechanical removal of a portion of Block II, excavation of rooms in the Block and test trenching to determine its spatial extent. In addition, a trash profile was excavated south of Block V. Our intent was to obtain data relevant to (1) the temporal ordering and horizontal boundaries of distinct architectural events, and (2) their relationship with resource variables in the area. The trash profile, while not directly associated with Block II, was intended to provide data corresponding to the broader occupational sequence at the pueblo. The major aspects of these procedures are discussed below.

#### Definition of Rooms - Removal of Overburden

The initial location of rooms involved the removal of a portion of Room Block II with a road grader. This area was selected for this procedure not only because it expanded our investigation into a relatively unknown area, but because prior disturbance in the Block allowed the use of such a potentially destructive technique with minimal additional loss of information. Once the overburden had been removed, the grid system was reestablished. An additional amount of soil was then removed by hand from each grid provenience within the cut area. The amount of soil removed varied with surface peculiarities of the individual grids. In most cases, this was approximately .4 foot of overburden. Unlike test trenching, the blade-cut and subsequent surface stripping exposed a relatively wide surface area. Several rooms were exposed in this manner. These rooms included 111, 112, 113, 114, 115, 116, and 120 displayed on map 1b.

#### Excavation of Rooms

With the exception of room 119, all room excavation was restricted to the area of the blade-cut. In the process of excavation, it became clear that we were dealing with at least two temporally distinct

structures in Block II. Our first indications were seen in the presence of a series of offset walls and floors underlying those exposed by the blade-cut. The extent of the variation could not be accounted for by multiple story construction or simple room repair. This was in keeping with the pattern identified in Block I during the 1974 field season. In Block II, however, it is probable that a third occupational level was once located directly above the area removed by the blade-cut. Student notebooks from the 1948 field session describe shallow floors in the vicinity of the Block. Additional shallow footings are also visible west of the cut area. Unfortunately, due to the previous disturbance, any such rooms are now missing.

For purposes of this report, I have tentatively divided the vertical configuration of rooms into three occupational phases; initial, middle and final. Initial and middle designations refer to the rooms located under the blade-cut and trenches. The final level allows for the possibility of surface rooms removed by the 1948 excavation. I am concerned here with only the initial and middle of the three phases. The designation initial implies that rooms were constructed at some time during the first occupation of the site. The criteria for inclusion in this level are (1) the construction of walls directly on culturally sterile soil, (2) the presence of wall configurations forming a structural unit not aligned with the overlying unit, and (3) ceramic frequencies such that red glazewares cluster below 30 percent of the total decorated wares.<sup>4/</sup> Rooms 116-4C, 117, 118, and 121 plus a number of walls discovered by test trenching are included in this period. These are displayed on map 1b. Rooms grouped into the middle classification were built over the earlier structure or its associated trash, had distinct wall alignments and glazeware frequencies above 40 percent. These rooms include 111, 112, 113, 114, 115, 116-4A & 4B, 119, and 120. The test trenching discussed in the following section located additional walls that have tentatively been grouped with this level (map 1b). The room summary table at the end of this section summarizes much of the available data pertaining to these rooms. It should be remembered, though, that the designations are tentative and subject to change as analysis proceeds.

Since they were nearest to the surface of the blade-cut, the middle period rooms were excavated first. Rooms 111, 112, 113, 115, 116, and 119<sup>5/</sup> were completed. With the exception of room 119, all rooms were excavated in the same manner. A 3x3 foot test pit was placed in a corner of each room. These were excavated in

arbitrary half-foot intervals until floors were located. Where possible, roof fall was separated from room fill. Arbitrary half-foot levels were then used to excavate the entire room fill, roof fall and floor surfaces. Where deviations from the half-foot levels were necessary, the floor levels were excavated in larger increments. In order to obtain finer control of floor contents, a 5 percent sample was washed through fine mesh screen in addition to the usual total "quarter inch" screening done with all levels. Pollen and soil samples were taken for all levels. Special samples were taken from all features. Two cases deserve special mention. First, rooms 113 and 115 were located directly above distinct initial period rooms (rooms 117 and 118). In these middle phase rooms, a half-foot layer underlying the lowest floor was removed and analyzed with the associated upper room. The intent was to remove cultural material that may have been thrown over the initial rooms immediately before construction of the upper structure. Second, due to its shallow depth, room 119 was excavated in only two levels. The modern hill surface was stripped, and the remaining overburden removed from the floor. The walls were very eroded and only two could be located. We had to excavate the floor to its extent and define the room limits on that basis. Room features are summarized on the chart that concludes this section.

Rooms grouped with initial construction in Block II are built directly on culturally sterile soil or bedrock. The excavated rooms include 117, 118, and the 4C floor of room 116 (map 1b). The excavational procedures were similar to those for the middle phase structure: floors were located by test pits and the entire room excavated in arbitrary, half-foot levels. Sub-floor tests were conducted in all rooms. These encountered sterile soil immediately, and excavation was halted.

Due to time limitations, we were unable to excavate additional rooms. Based on the evidence presently available, it appears that there are three distinct occupational levels represented in and around Block II. The initial structure may be a part of the same occupational phase represented by the lowest level structure in Block I. The final occupational level appears to be spatially restricted; not extending further east than Block II. Architectural data concerning this occupation are quite limited.

Table 5 summarizes the major room features excavated this season in Block II. Reference should be made to grid level records on file in the UNM Field School laboratory if more detail is required.

Table 5

Room Summary

Room & Floor Desig.	Wall Max. Depth Below Datum	Floor Depth Below Datum	On Sterile Soil	Wall Comp.	Floor Comp.	Hearths	Bins	Doors	Dendro Sample	Decorated Ceramics	
										Red Glaze n/%	Bla/Whi Wares n/%
FINAL PHASE	None	Not applicable									
Room 111	7.40	No								All floors burned	
4A	5.89	No	adobe	clay	1-double	No	U/K	Yes		Only hearth excavated	
4B	5.58	No	adobe	clay	1	2	U/K	Yes	48/85.7	8/14.3	
Room 112	9.51	No								All floors burned	
4A	7.76	No	mas/adobe	clay	1	2	U/K	Yes	58/73.4	21/26.6	Profuse corn & grinding stones
4B	8.11	No	mas/adobe	clay	2	No	U/K	Yes	12/73.2	7/36.8	
4C	8.51	No	mas/adobe	clay	1	1	U/K	No	10/62.5	6/37.5	Sub-floor cyst
MIDDLE	7.76	No									
4A	6.46	No	adobe	clay	No	No	U/K	No	68/70.1	29/29.9	
4B	7.01	No	adobe	clay	1	No	U/K	No	23/65.7	12/34.3	Burned

Table 5 (Continued)

## Room Summary

PHAS	Room & Floor Desig.	Wall Max. Depth Below Datum	Floor Depth Below Datum	On Sterile Soil	Floor Comp. Comp.	Hearths	Bins	Doors	Dendro Sample	Decorated Ceramics			
										Red Glaze n/%	Bla/Whi Glaze n/%	Wares n/%	Miscellaneous
(Continued)													
Room 115	8.00	No											Modern floor disturbance
4A	6.82	No	mass / adobe	clay	U/K	U/K	No	No	14/66.7	7/33.3	Fragmentary floor		
4B	7.40	No	mass / adobe	clay	U/K	U/K	No	No	26/59.1	18/40.9	Fragmentary floor		
Room 119	11.16	No											
4A	10.66	No	adobe	slab	No	No	U/K	No	35/50.0	35/50.0	0.2 walls not located		
Room 116	10.50	No											
4A	9.50	No	adobe	slab	No	No	1-south 1-east	Yes	18/54.5	15/45.5	Collapsed west wall		
4B	9.60	No	adobe	clay	No	No	"	No					
Room 116	10.50	Yes											
4C	9.95	Yes	adobe	stone / clay	1	No	1-south 1-east	No	0/0.0	38/1.00	Cobble semi-circle		
Room 117	11.56	Yes											
4A	10.46	No	adobe	clay	No	No	1-west	No	3/17.6	14/82.4	Approx. 2/3 excavated		
4B	10.56	Yes	adobe	slab	No	No	1-west	No		"			
Room 118	11.60	Yes											
4A	9.4	No	adobe	clay	No	No	1-west	No	12/48.0	13/52.0	Pos. ceramics from room 115		
4B	11.02	Yes	adobe	cobble	No	No	1-west	No	2/20.0	8/80.0			

### Test Trenches

Test trenches were used to identify the horizontal limits of the initial and middle occupational phases. Eight trenches were dug: seven north and south of Block II and one south of Block I (map 1b). Four trenches (labeled A through D) were excavated by my group and four (labeled E through H) by the group directed by Brona Simon. In all cases, the excavational procedure was the same. The trenches were 3 feet wide and set parallel to our grid system. Surface soil (1A level) was removed to whatever depth was necessary to form a horizontal plane. Deeper excavation proceeded in horizontal half-foot arbitrary levels. When walls were located, the trenches were extended further from the center of the block. Excavation was halted when it became clear that no additional walls were to be found (see maps 1b, 3, and 4).

All trenches except for C and D are complete, the outermost wall having been located in each trench. Due to the close of the field season, we were unable to extend trench C further east. As a result, we have not yet located the limit of the room cluster in the area. It should be completed during the 1976 field season. We may also wish to deepen trench D. While we have apparently located the extent of a series of shallow footings, it is not yet deep enough to locate possible underlying walls. Further extension of trench D to the south would additionally help define the as yet undetermined northern extent of Room Block V.

The assignment of walls to the initial or middle occupational phases is based on their depth below datum, their construction on either culturally sterile or previously inhabited ground, and their configuration relative to one another. On these bases, the walls identified by trenches B, C, G, and H (map 3) appear to represent initial occupation at the site corresponding temporally to rooms 117, 118 and 116-4C. The northernmost wall in trench A (map 4) seems to set the northern limit to both the initial and middle phases. During initial occupation, a cluster of rooms extended south from this point, through the later plaza area and into Block V. The precise southern limit is not yet known, but it should lie in the vicinity of 90 to 100 feet south of datum. We have yet to determine the eastern extent of this central cluster of rooms. A logical extension of walls belonging to the lower structure of Block I and those in trench C, however, indicate a boundary in the vicinity of 80 to 90 feet east of datum.

Walls that I have classified with the middle occupational phase were those located immediately under the blade-cut. These may be contemporary with upper-level rooms in Block I and the shallow footings in trench D (map 1b). Some of the walls in trenches A, E, and F may have been utilized by both the middle and initial occupations. The slab floors of room 119 and in trench F appear to be the northern and northeastern limits of the block for the occupation. The presence of trash and some offset walls under these floors, though shallow, provide the basis for inferring that the initial level underlies and/or shares these walls. Room 112 is the southern limit of Block II during this occupation. Trench B failed to encounter any walls south of this point at a comparable depth.

In summary, walls located in the test trenches and rooms excavated under the blade-cut have allowed us to revise our estimates of the size and location of distinct occupational phases in the area. During initial occupation, rooms extended across the entire area between Blocks II and V. They ranged from approximately 54 feet north to 90 plus feet south of datum (at 046 E) and 80 plus feet east to an undetermined location west of datum (measured at 045 S). These appear to align with the lowest rooms in Block I and undetermined rooms in Block V. The middle level was not as extensive in Block II. It ranged from 54 feet north to 26 feet south of datum. It may join with the upper level rooms in Block I to the east and some rooms (though probably not surface rooms) in Block III to the west. Its relationship to Block V is not known, though it may lie in to the adobe footing found in this season's trash profile.

#### Excavation of Trash

A major effort was made this season to expand our sample of trash material. Two 10- by 10-foot grids were excavated in the main mound from the modern surface to culturally sterile soil. One grid was excavated by crews under the direction of Brona Simon (020N/000W). Our group excavated grid 100S/030E south of Block V.

This season, all trash profiles were excavated in arbitrary levels.<sup>6/</sup> The procedure was the same for each sample. First, a three by three foot test pit was placed in the corner of each grid. It was dug in half-foot horizontal levels to a depth of 3 to 4 feet (the depth was determined only by the difficulty of digging in such a restricted space.) A profile of the discernible natural trash lenses was then transferred to graph paper. Particular attention was given to ash; working with the assumption that it washes more readily than most

materials and should, therefore, most closely approximate the natural contour of the trash area at the time of deposition. Lines paralleling the natural lenses were superimposed onto the graph paper at scale half-foot intervals. We then computed the slope of these lines. The slope established the angle at which we were to excavate in order to avoid cross-cutting temporally distinct depositional layers. In grid 100S/030E, the slope was set at .15 from south to north. This meant, simply, that for every 10 feet excavated horizontally from south to north, we rose vertically 1.5 feet. Each level then formed a diagonal plane accurately paralleling natural depositions. When the bottom of the initial test pit was reached, the entire procedure was repeated until culturally sterile soil was reached. The material removed includes pollen and soil samples from each level, 5% flotation and cultural material extracted by normal total screening through quarter-inch mesh. Stratigraphic profiles were drawn of the natural depositions visible in each face of the test pit. As a result, we were able to obtain large samples of trash which, combined with the samples taken in 1974, test an extensive area of the site. In addition, all levels in each sample area are of comparable volume. Such units should allow reliable statistical examination of changes in the composition of trash components and facilitate the formation of equally valid statements about associated behavioral events.

Full analyses of the trash material have not been completed. At the time of writing, I have been able to summarize the available data from this season's trash profiles, conduct chi-square tests on a portion of the ceramic and faunal material and prepare an interlevel comparison of absolute counts of the trash deposits. Table 6 summarizes the results of preliminary laboratory analysis of trash material from grid 100S/030E. Table 7 displays the results of chi-square tests performed on counts from adjacent levels of this material.

Due to its location on the southern edge of the site, inferences based on data from the trash profile in grid 100S/030E do not relate directly to those given for Block II. It should, however, reflect general patterns and yield evidence pertaining to the proposed three-part occupational sequence for the site.

Table 6  
100S/030E Trash Profile

Level	CERAMICS						BONE						LITHICS			
	Red Wares n/% Dec.	Bla/Whi Wares n/% Dec.	Las Lunas	Util. Total	Large Mammal	Small Mammal	Bird	Total	Tools & Mod.	Unmod. Flakes	Total	Flakes	Tools	& Mod.	Unmod.	Flakes
1A	429/69.5	188/30.5	34	1585	2743	41/13.2	170/54.8	99/31.9	310	6	334	340				
2A	38/52.8	33/47.2	10	237	318	8/12.7	37/58.7	18/28.6	63	3	45	48				
2B	14/28.0	36/72.0	13	282	345	17/11.8	97/67.4	29/20.1	144	4	62	66				
2C	23/15.0	130/85.0	35	543	731	43/16.3	174/66.2	46/17.5	263	1	143	144				
2D	25/15.2	140/84.8	52	759	976	68/20.6	227/68.8	35/10.6	330	9	93	102				
2E	9/07.7	108/92.3	51	633	801	100/44.2	90/39.8	36/15.9	226	13	115					
2F	7/08.9	72/91.1	41	521	641	61/24.2	146/57.9	45/17.9	252	10	118	128				
2G	1/01.5	66/98.5	20	567	654	19/17.6	87/80.6	28/25.9	108	6	93	99				
2H	17/08.8	177/91.2	40	1519	1753	32/10.1	176/55.7	54/17.1	316	4	99	103				
2I	5/04.6	103/95.4	16	727	851	23/17.2	80/59.7	31/23.1	134	2	50	52				
2J	1/09.1	10/90.9	0	73	84	2/15.4	8/61.5	3/23.1	13	0	5	5				

Table 7

Chi-Square Results

Provenience	CERAMICS			Initial Collapse			FAUNA		
	Red Glaze	Black & White	Four Cell X <sup>2</sup> P	Large Mammal	Small Mammal	Bird	Four Cell X <sup>2</sup> P	Four Cell X <sup>2</sup> P	
1A	429	188	.015	41	170	99	.85	.85	
2A	38	33	.015	8	37	18	.40	.40	
2B	14	36	.055	17	97	29	.45	.45	
2C	23	130	.97	43	174	46	.035	.035	
2D	25	140	.15	68	227	35	<.001	<.001	
2E	9	108	.975	100	90	36	<.001	<.001	
2F	7	72	.10	61	146	45	.075	.075	
2G	1	66	.08	19	87	28	.85	.85	
2H	17	177	.35	32	176	54	.27	.27	
2I & 2J	6	113		25	88	34			
Second Collapse									
1A	429	188	<.001	41	170	99	.05	.05	
2A & 2B	52	69	<.001	25	134	47	.005	.005	
2C & 2D	48	270	.03	111	401	81	<.001	<.001	
2E & 2F	16	180	.75	161	236	81	<.001	<.001	
2G & 2H	18	243	.67	51	263	82	.31	.31	
2I & 2J	6	113		25	88	34			

P = probability that the observed variation is due to random error.

The available data lend general support to the sequence, though the results are not clearcut. The general expectations and results are summarized below.

1. At the beginning of excavation in the grid, a stone wall alignment was visible on the surface. This was the southern limit of room 93. The second excavational level encountered an additional set of walls clearly offset from the overlying stone alignment. These, in turn, were constructed over trash deposits extending down an additional 3 to 4 feet below the lower walls.

In keeping with the expectations from Block II, the configuration of architecture and trash in this grid appears to indicate the presence of at least three occupational levels. Based solely on its presence on the surface and shallow depth, I would tentatively place the stone alignment of room 93 with the final occupation of the site. The underlying adobe wall remnants may represent the middle occupation. The trash beneath these walls represent an earlier (or possibly the earliest) occupation(s), the limits of which lie somewhere north of the 100 south grid line.

2. At Tijeras Pueblo, there is a gradual transition through time from predominantly Black and White to predominantly Red Glaze decorated ceramics. On the basis of work through 1973, Judge (1974:41-43) notes a clustering of relative percentages of the two types. After their introduction, Red Glaze wares gradually increased to approximately 30% of the total decorated wares. Following an inferred population decline or abandonment, the percentage ranges from approximately 45 to 60% glaze. After a second decline, glaze wares predominate the total for a brief period of occupation at Tijeras. If the three-part sequence holds in this test, we should observe a similar clustering. The relative percentages should furthermore reflect the configuration of trash and walls in the test pit (i.e., Black and White wares should predominate for most of the lower levels underlying the adobe wall, the percentage should then change toward parity in the level adjacent to the adobe wall, and glaze wares should dominate the uppermost level).

A glance at the trash profile summary in Table 6 does, in fact, reflect the expected pattern. From the lowest level (2J) through 2B, glaze wares gradually increase to 28% of the total. The 2A level (in which the adobe walls are located) contains 53% glaze wares. In the surface (1A) level, glaze wares are 70% of the decorated ceramics.

3. The Chi-square tests for ceramics were conducted in 2 by 2 contingency tables comparing the two types for pairs of adjacent levels. If the pattern observed above holds, we should observe statistically significant disconformities between levels 1A and 2A, and between levels 2A and 2B where the percentage changes occur. The initial Chi-square collapse shown on Table 7 meets this expectation with an error probability of approximately .015 for both sets.

The tests also contain disconformities of somewhat lower significance. The break between levels 2B and 2C may be due, in part, to the marked decline in the size of the sample. This is to be expected if the site underwent a period of population decline at the time that the material was deposited. Since the adobe walls do not extend below the 2B level, this is precisely what we would expect. The breaks between levels 2F and 2G and between 2G and 2H cannot be trusted due to the inadequate sample size for the 2G/glaze cell common to both tests. The "second collapse" shown on Table 7 eliminates this disconformity while preserving (and, in fact, clarifying) the original three.

Architectural indications, ceramic percentages and rough statistical tests all support the inferred three-phase occupational sequence for this portion of Tijeras. They furthermore tend to indicate that the final two occupations were relatively brief and late in Block V. The latter inference cannot be firmly established at the present. Contradictory results come from the interlevel comparison discussed under number 5 below.

4. An examination of percentage figures and Chi-square results for faunal material is not so easily interpreted. If resource depletion were a factor contributing to the population declines at Tijeras, we would expect to observe a decline in the relative percentage of large to small mammal bones in levels immediately prior to abandonment. While Table 6 shows such percentage changes, their pattern does not lend itself to clear interpretation at this point. The Chi-square tests for fauna do not resolve the problem. Significant disconformities do occur, but at levels somewhat deeper, and hence earlier, than anticipated. The "second collapse" shows an overabundance of significant disconformities. Of interest, however, are the disconformities on the "initial collapse" between levels 2F through 2C. These, combined with a gradual decrease in the number of large mammal bones, may indicate a gradual depletion of regional subsistence

resources over time. This, in turn, could contribute to the abandonment of the initial or middle phases at the site.

5. I have argued that one advantage of trash excavation in arbitrary levels is the ability to achieve comparable volume for each of the levels. This should facilitate comparison of absolute counts of trash material since recovery probability is identical for each level. These counts should change through time in a manner reflecting population dynamics at the site. During periods of relatively high population levels, trash deposits of all kinds should be more profuse than during periods of lower population or abandonment; we would not necessarily expect to find totally culture-free deposits.

Applying the inferred occupational sequence, the trash content of the various levels should display a predictable pattern. Progressing from bottom to top, the trash profile should exhibit a general "increase-decrease-increase-decrease-increase" pattern in cultural material. The final occupation (the last increase) may or may not be followed by a decline, dependent on whether the area underwent deposition or erosion following final abandonment. Table 8 and histograms (figure 1) display the results of such an interlevel comparison for grid 100S/030E.

The graphs clearly reflect the pattern expected from a three-part occupational sequence. The only notable exception is the suppressed peak in the 2H level of the lithics graph. Given our basic assumption concerning the relationship between rates of trash deposition and population dynamics, the results tend to indicate a period of population increase from the lowest (2J) level through 2H. Level 2G seems to represent a period of rapid decline. Population then increased to a lower peak in level 2D. A second period of decline is indicated in levels 2B and 2A followed by an abrupt increase in level 1A. While these results only pertain directly to Block V, they further support the general sequence proposed for Block II as well.

A discrepancy between these results and those from the architecture, ceramic percentages and Chi-square tests should be noted. The earlier findings (numbered 1, 2 and 3 above) tend to indicate a long period of initial occupation, followed by two brief occupations represented by deposits near the surface of the trash profile. The interlevel comparison presented indicates an initial population increase and decline fairly deep in the trash deposits. This

Table 8

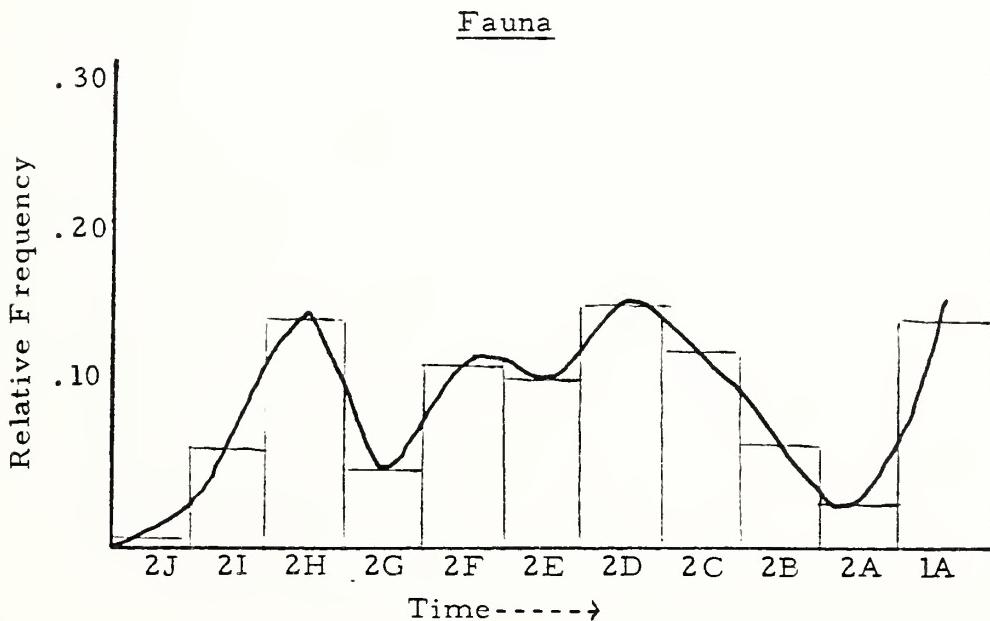
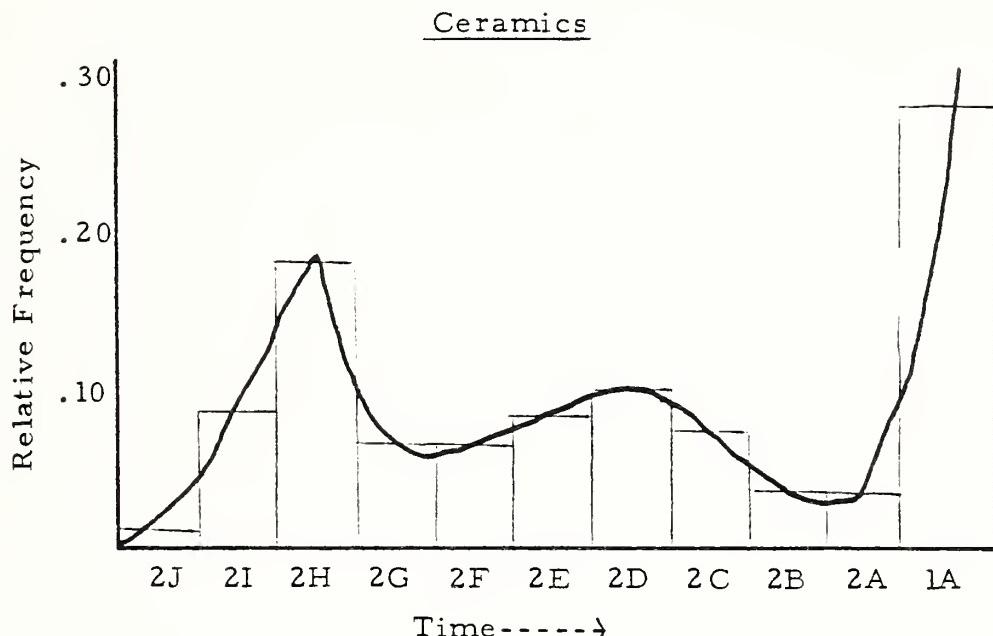
Cultural Material by Level

	Trash Level	2J	2I	2H	2G	2F	2E	2D	2C	2B	2A	1A	Total
Ceramics	84	851	1753	654	641	801	976	731	345	218	2743	9897	
Fauna	13	134	316	108	252	226	330	263	144	63	310	2159	
Lithics	5	52	103	99	128	128	102	144	66	48	340	1215	
Combined	102	1037	2172	861	1021	1155	1408	1138	555	429	3393	13271	
Relative Frequency													
Ceramics	.009	.086	.178	.066	.065	.081	.099	.074	.035	.033	.278	1.004	
Fauna	.006	.062	.147	.050	.117	.105	.153	.122	.067	.030	.148	1.007	
Lithics	.005	.043	.085	.082	.106	.106	.084	.119	.055	.040	.280	1.005	
Combined	.008	.079	.164	.065	.077	.087	.106	.086	.042	.033	.256	1.003	

Time ----->

Trash Profile Grid 100S/030E

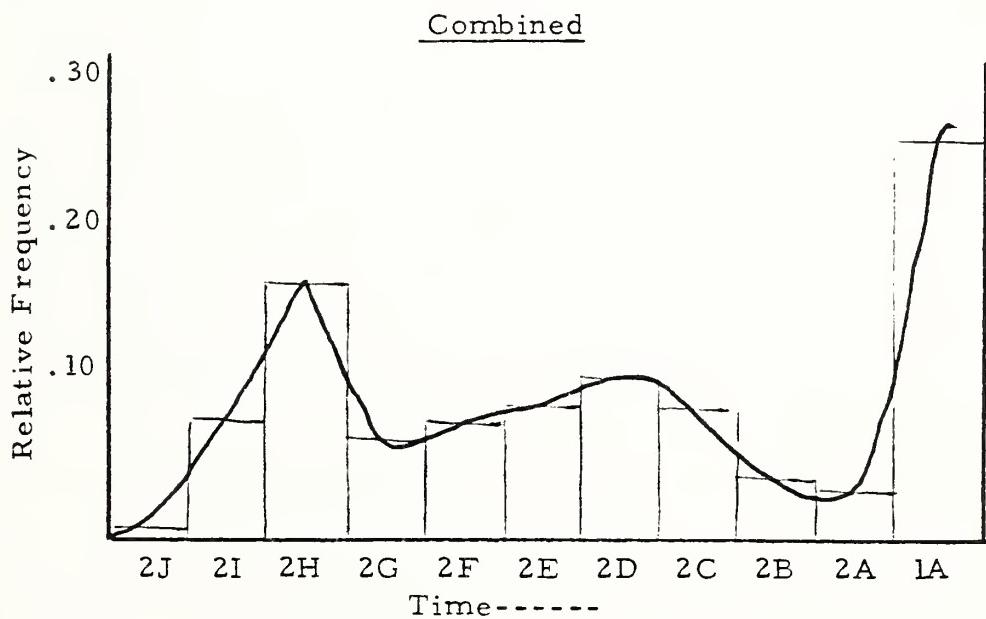
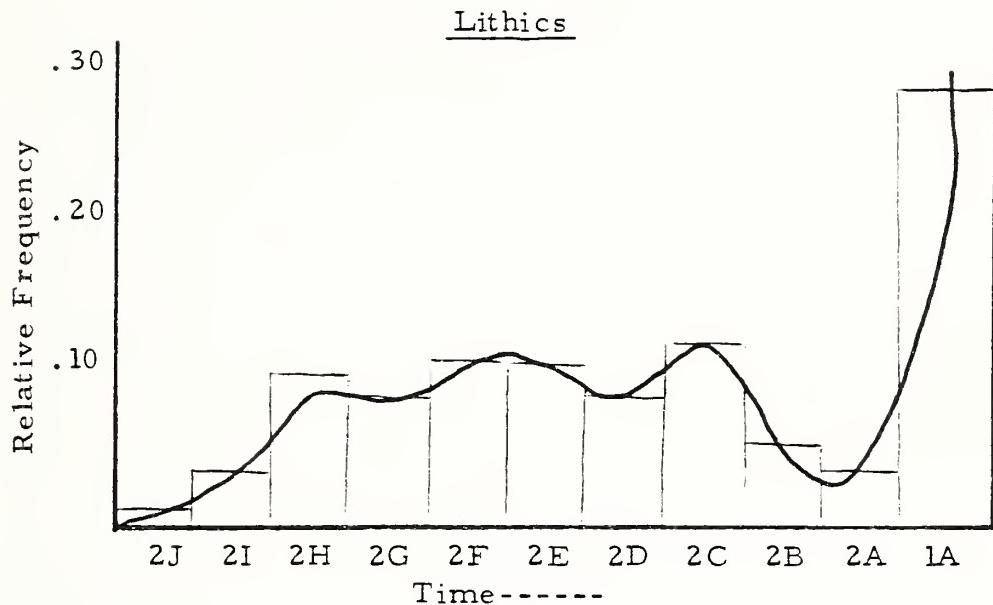
Figure 1. Histogram of Absolute Counts of Trash Deposits





Trash Profile Grid 100S/030E

Figure 1. Histogram of Absolute Counts of Trash Deposits





corresponds closely with an adobe and clay stratum noted by the excavators. Though this natural stratum was not clearly defined, it is possible that it reflects abandonment associated erosion of an initial level wall immediately north of the test pit. It is possible that the adobe walls visible in levels 2C and 2B were a relatively late extension of the middle occupation over previous trash deposits from the same phase. The walls may also reflect later, temporally distinct construction at the site. At this point, I cannot eliminate the alternatives. However, it is possible to state that the proposed three-part occupational sequence for Tijeras Pueblo is strongly supported by available data from trash south of Block V. Finer-grained interpretation of the sequence and its relation to resource variables must await more exacting analysis of trash material and additional excavation in the area.

### Summary

The bulk of this season's effort was devoted to the delineation and excavation of architectural remains, and to the excavation of a large sample of trash material. In this report, I have described our procedures and presented a preliminary interpretation of the results. Most of the discussion has centered on the delineation of the occupational sequence for the site with particular emphasis on Room Block II. The classification and inferred structural configuration reflect my interpretation of the data presently available. They are subject to change as analysis continues. The material in this report, however, has been presented in terms of three tentative phases. Architectural data from the vicinity of Block II indicate the presence of at least two major construction events. The extent of the architectural units, their relative depths and alignments support a minimal two-part occupational sequence. Surface indications west of the block and previous excavation at the site make a third, perhaps brief, phase probable. Data presently available from trash south of Room Block V lend strong support to the inferred three-phase sequence. Further excavation, more detailed analysis of tree-ring dates, cultural material and resource data should firmly establish or alter the sequence; and facilitate firm statements about the determinants of these dynamics.

### A Note on the Excavation of Trash Profiles

I have argued elsewhere (Burtchard 1975:49 and 53-54) for the preferability of excavation in arbitrary as opposed to natural levels of trash in areas where natural levels are not extensive and/or

objectively distinguishable. I maintain that, in such cases, the reliability of cultural inferences may be enhanced by the use of arbitrary levels paralleling the discernable natural lenses. They free the excavator from the possibility of subjective error in the delineation and excavation of "natural" levels, and allow interlevel comparison of absolute counts of trash material (Drucker 1972:13). This is not meant to imply that, at such sites, natural stratigraphy cannot be seen. Ash lenses and adobe wash are often visible and, in fact, form the basis for establishing the angle of the arbitrary levels at Tijeras. Loose (1975:61) favors the excavation of both natural and arbitrary strata. She argues that arbitrary levels tend to obscure culturally relevant inferences by lumping possibly distinct natural strata into single units. She argues further that natural levels give a more accurate picture of the occupational sequence and make it easier to delimit and pinpoint changes in components. She is correct, of course, in noting that arbitrary levels may combine natural strata. In my opinion, she is incorrect in assuming that excavation of natural trash strata will increase inferential accuracy for sites such as Tijeras Pueblo. On the contrary, excavation of these strata may lead to undetectable inferential error. The assumption that natural stratigraphic layers reflect distinct behavioral or geological events underlies the justification for the excavation of these strata. This assumption may not be valid when applied to sites such as Tijeras Pueblo that have been subject to a relatively brief, but intensive, occupational sequence. Heterogeneous cultural debris cannot be expected to react homogeneously to natural erosional processes. Unless separated by major depositional events, visible strata tend to differentiate temporally identical materials. Ash, for example, can be expected to erode more readily and with a different pattern than will denser trash materials (adobe, ceramics, etc.). If, in the process of excavation, these levels are defined and excavated as distinct strata (as is often the case), they will be separated from depositionally related materials. Inferences based on such strata may then reflect no more than differential processes of erosion, random differences in deposition, or errors in excavation rather than genuine behavioral variation. If somewhat less precise, carefully excavated arbitrary levels minimize the probability of advancing inferences based on a biased or limited sample. They also allow visual inspection of natural strata in the completed faces of the profiles and possible subsequent excavation of these strata should it prove desirable. In any case, initial investigation at sites such as Tijeras may be most usefully conducted by careful use of arbitrary levels.

References

- Burthard, Greg C.
- 1975 Appendix C to L.S. Cordell The 1974 Excavation of Tijeras Pueblo, Archeological Report No. 5, USDA Forest Service, Southwestern Region, Albuquerque, 45-55.
- Cordell, L. S.
- 1975 The 1974 Excavation of Tijeras Pueblo, Archeological Report No. 5, USDA Forest Service, Southwestern Region, Albuquerque.
- Drucker, Philip
- 1972 "Stratigraphy in Archaeology: an Introduction," in Current Topics in Anthropology, Addison-Wesley Publishing Company, Reading, Mass., Module 30:1-18.
- Judge, W. James
- 1974 The Excavation of Tijeras Pueblo 1971-1973: Preliminary Report, Archeological Report No. 3, USDA Forest Service, Southwestern Region, Albuquerque.
- Loose, Ann A.
- 1975 Appendix D to L.S. Cordell The 1974 Excavation of Tijeras Pueblo, Archeological Report No. 5, USDA Forest Service, Southwestern Region, Albuquerque, 56-68.



**Appendix D**

**Teaching Assistant  
Report 1975 Season**

by  
**Brona G. Simon**



Excavation at Tijeras Pueblo by Group I during the 1975 summer field session encompassed a number of projects. These included excavation of 10'x10' trash samples from grid 20N/0W in the northwest part of the main mound; and from 170N/130W in the southeast part of the "L"-shaped outlier northwest of the main mound; the excavation of room 108, a large rectangular kiva; further excavations of rooms 60, 102, and 110; and the establishment of four test trenches labeled E through H to the northeast, northwest, south, and southwest of the blade cut area (maps 3 and 4).

Our activities were mixed, but our goal in each of these projects was the same: the unravelling of the chronology of occupational and building phases throughout the site. The trash samples gave us ceramic frequencies for comparisons to other rooms or trash. Room 108 gave us many tree-ring samples related to its construction and fill. Rooms 60, 102, and 110 were excavated to bedrock. Trenches E-H delineated the configuration of subsurface architecture. Subfloor tests in three of these trenches showed their relation to bedrock.

Some of our assumptions relating to the organization of rooms in a chronological sequence of initial, middle, and final occupations include: (1) that floors and concomitant walls built directly on bedrock or sterile soil are of the initial period, (2) that ceramic frequencies from floors can be correlated to give a rough estimate of relative ages of the rooms, (3) that superior offset walls relate to a new occupation unless there is no evidence of erosion of the deeper walls, in which case there was likely simple remodeling.

#### Grid 20N/0W

After analysis of cultural material obtained from the 1974 excavation of trash in 20N/20W, it became evident that another sample of trash from this part of Tijeras Pueblo was necessary for intrasite comparisons. The trash sample from 10N/20W, 20N/20W, and 30N/20W was not adequate for analysis. These grids had been dug by natural levels (Loose 1975:58-62), giving a set of stratigraphic levels which were not of comparable proportions. It was decided that collection of a trash sample this year from 20N/0W would be excavated in arbitrary .5' levels to give levels of equal size for comparisons within the sample as well as with trash from 0N/100E and 100S/30E. This was accomplished.

A major problem in excavating this 10'x10' grid of trash was the sloping contour of its surface. A 3'x3' test pit, T1, was sunk to a depth of 5 feet in the southwest corner of the grid to determine the slope of the underlying natural strata. The natural levels observed in the stratigraphic profile of the pit were almost horizontal compared to the surface gradient. A composite angle between the surface slope and the near-horizontal strata of the test was determined, and excavation within the grid added .14 feet of depth for every horizontal foot north (downslope). Thus, we excavated in arbitrary, slanted levels. In our records, however, all level depths are from the 20N line for simplicity's sake.

Excavation of grid 20N/0W was completed to sterile, level 2P, a red-purple clay which varied in depth from 9.14 feet to 11.64 feet ED. After stratigraphic profiles were drawn, the superposition of arbitrary levels on the sketches of natural levels revealed that there had been some cross-cutting of the natural strata by our arbitrary units. It was obvious that the test did not truly represent that natural depositional configuration. However, as stated elsewhere (Purtchard 1975:53-54), not all natural levels at Tijeras Pueblo reflect significant occupational events. The most noticeable natural stratum is the ash and/or charcoal lens. It is likely that an ash lens was the result of a disposal of firepit refuse and may reflect nothing more temporally significant than that. Thus, in 20N/0W, our arbitrary levels which split through natural levels such as ash lenses are probably not misrepresenting the occupational history of the site.

Another problem was that the initial levels did not cover the whole grid until level 2E was excavated. Levels 1A through 2D have been combined for analytical purposes and thus do not equal, by volume, the other levels.

After preliminary analysis of the trash material from 20N/0W (Table 9), we did not discover any anomaly in the frequencies of Black-on-white to redware sherds which could not be explained, except for the p .001 level of significance of the Chi-square (second collapse) obtained by comparing the combinations of levels 2J and 2K and of levels 2H and 2I (see Tables 7, 10 and 11). The percentage of redwares in levels 2J and 2K together is only 36.1%, while in levels 2H and 2I together, redwares constitute 71.7% of the decorated wares. We interpret this change in ceramic frequencies to reflect a discontinuity in the occupation of the room block associated with the trash area. When one examines the

Table 9

## Trash Profile - Grid 20N/0W

Level	Red-Wares n/% of Decor.	B/W Wares n/% of Decor.	Los Lunas Smudged	Util.	Total	Large Mammal n/%c	Small Mammal n/%c	Bird n/%c	Total	Tools & Mod. Flakes	Unmod. Flakes	Total
IA	3/50.	3/50.	0	124	130	1/14.3	6/85.7	0/00.	7	1	40	41
2A	1/10.0	0/0	0	7	8	0/0	2/10.0	0/0	2	0	0	0
2B	5/55.6	4/44.4	0	22	31	0/0	1/10.0	0/0	1	1	6	7
2C	18/72.0	7/28.0	2	87	114	5/41.7	7/58.3	0/0	12	5	24	29
2D	94/72.3	36/27.7	12	535	677	12/21.8	42/76.4	1/01.8	55	30	94	124
IA-2D Total	121/70.8	50/29.2	14	775	960	18/24.3	58/75.3	11/01.3	77	37	164	201
2E	142/70.6	59/29.4	2	652	855	37/23.9	114/73.5	4/02.6	155	46	99	145
2F	193/72.3	74/27.7	4	1264	1535	104/29.0	119/55.4	56/15.6	359	69	157	226
2G	104/78.2	29/21.8	2	696	834	70/34.3	93/45.6	41/20.1	204	25	49	74
2H	123/76.9	37/23.1	2	1090	1252	59/22.8	184/71.0	16/06.2	259	55	106	161
2I	82/65.1	44/34.5	7	530	663	21/16.7	85/67.5	20/15.9	126	20	27	47
2J	31/46.2	36/53.8	4	376	447	19/17.8	79/73.8	9/08.4	107	1	57	58
2K	48/31.8	103/68.2	16	859	1026	42/11.1	272/72.1	63/16.7	377	19	74	93
2L	89/47.2	66/52.8	14	707	876	96/21.1	299/65.9	59/13.0	454	41	53	94
2M	9/15.3	50/84.7	8	440	507	40/24.7	96/59.3	26/16.0	162	64	60	124
2N	12/22.6	41/77.4	12	552	617	36/34.3	57/54.3	12/11.4	105	38	63	101
2O	1/12.7	5/83.3	3	63	72	1/-	4/-	6/-	11	2	4	6

Table 10

## Grid 20N/0W - Chi-square - Initial Collapse

Level	CERAMICS			FAUNA		
	Red Glaze	Black-on-White	Four Cell X <sup>2</sup> → P	Large Mammal	Small Mammal	Bird
1A - 2D	121	50	.50	17	52	1
2E	142	59	.18	37	114	4
2F	193	74	.25	104	199	
2G	104	29	.96	70	93	56
2H	123	37	.04	59	184	.15
2I	82	44	.02	21	85	
2J	30	35	.055	19	79	41
2K	48	103	.001	42	16	.001
2L	89	66	.001	96	272	.01
2M	9	50	.50	40	299	.35
2N - 2O	12	43		37	61	.50
						.03

Table 11

Grid 20N/0W - Chi-square - Second Collapse

Level	CERAMICS			FAUNA		
	Red Glaze	Black-on-White	Four Cell $X^2 \rightarrow P$	Large Mammal	Small Mammal	Bird
1A-2D & 2E	263	109	.06	54	166	5
2F-2G	297	103	.50	174	292	97
2H-2I	205	81	.001	80	269	36
2J-2K	78	138	.06	61	351	72
2L-2M	98	116	.003	136	395	85
2N-2O	12	43		37	61	18

stratigraphy of the west wall of this trash grid, a natural stratum of adobe wash is clearly visible. This slide of orange adobe transverses the 10-foot length of the west wall, beginning at the southern (uphill) edge with a thickness of .1 foot and widening toward the north (downhill) to a thickness of 1.5 feet at 2N. It is located between and included in the arbitrary levels of 2H to 2K. Assuming that people dwelling in rooms will keep up the architectural structure of their homes, we believe that an adobe wash indicates erosional forces acting upon structures partially or fully made of adobe which are abandoned. Our belief that this part of the site was abandoned is strengthened by the architectural configurations in the pueblo just south of the 1974 and 1975 trash sample area. It was reported by Loose (1975:60) that an adobe wash area discovered in the 10N/20W grid "may have been associated" with "a massive stone and adobe wall with heavy adobe footing." This wall is the north wall of room 102 and, by its thickness, seems to be an exterior, boundary wall. The adobe "footing" measures 3.2 feet to 4.2 feet in height after complete excavation of rooms 102 and 110 to bedrock this year, and has a highly irregular, eroded-looking top upon which the masonry wall rests. Although very little cultural material was discovered in the excavation of these rooms (see below), it is suggested that these rooms are of the same, early occupation phase, reflecting remodeling, and may be related to the very early trash levels of 20N/0W (2J-2N). The surface rooms such as 59, 51, and 96 which are no longer visible due to erosion or previous excavation (Judge 1974) probably represent a second occupation, as they are built in an offset manner, over the previously abandoned structures such as the room 107 complex, and they probably relate to the upper strata of the trash of 20N/0W where redwares approximate 70% of the decorated wares. There is no architectural evidence nor evidence from the 20N/0W trash which implies that there were three separate occupations of the northwest part of the main mound.

Whether or not Tijeras Pueblo was completely abandoned before redwares reached 50% is not yet known. It seems to be the case in the blade cut region (Burtchard, this report) and in the northwest section.

Six burials, three adults and three children, were excavated from 20N/0W this summer. Five were discovered in the earliest strata (2M-2O) though none appeared directly associated with any other. There is a possibility that one of the child burials, No. 1-20N/0W-2N-B4, was buried with its cradleboard, for we found a tan and a

dark brown substance similar to rotting wood along the child's spine and under its pelvis.

#### Grid 170N/130W

This summer, we received permission to test a 10'-square area of the outlier to the northwest of the main mound. This room block was Block VII (map 3). It is most likely an "L"-shaped outlier, though no precise map of surfaced rooms has yet been drawn. It is located on the eastern slope of small hill, the foot of which has been badly eroded by a recent arroyo.

We were interested in discerning the date of occupation of this outlier in relation to the main mound by analysis of its trash material to determine whether, if contemporary, it was subject to the same pressures for abandonment as the main mound or, if later, it was occupied closely after the abandonment of the main mound.

Test pits 3'x3' were sunk in two separate grids at Block VII (295N/0W and 325N/40W), both of which proved to be sterile. A third 3'x3' test was made in grid 170N/130W, at Block VII, successfully locating a trash deposit. This grid was chosen to test because of its proximity to room structures visible on the surface. No evidence of walls or floors were discovered while excavating the 10'x10' grid, however, so we were probably safely digging in a trash area.

Sterile soil was reached at level 2E, 12.39 feet BD. Excavation was again by arbitrary .5-foot levels, each on a horizontal plane. Our digging levels did not cut across natural strata lines, which were likewise fairly horizontal, but the arbitrary levels did split three of the natural layers. Such splitting of natural levels probably does not distort our image of what was happening at the site. Arbitrary levels can be analyzed in sets if initial analysis does not seem reasonable. In this case, however, ceramic frequencies of the arbitrary levels of 170N/130W do not reveal any drastic disconformities. In fact, there appears to be a linear progression of ceramics from 35% to 65% redwares through time (see Tables 12 and 13).

#### Room 60

After excavation of rooms 102 and 110, we excavated that which remained below the floor of room 60 which had also been previously dug. Since ceramic collections from 102 and 110 were so scant, we

Table 12

Trash Profile - Grid 170N/130W

Level	Red-Wares n/% of Decor.	B/W Wares n/% of Decor.	Los Lunas Smudged	Util.	Total	Large Mammal n/%	Small Mammal n/%	Bird	Total	Tools & Mod. Flakes	Unmod. Flakes	Total
1A	126/65.3	67/34.7	12	940	1145	19/27.5	33/47.8	17/24.6	69	12	79	91
2A	101/62.7	60/37.3	9	1254	1424	60/47.2	27/21.3	40/31.5	127	18	102	120
2B	86/52.4	78/47.6	21	1556	1721	82/48.0	48/28.1	41/24.0	171	13	82	95
2C	68/48.6	72/51.4	31	1317	1488	35/43.8	16/20.0	29/36.3	80	12	48	60
2D	29/34.5	55/65.5	8	527	619	25/45.5	20/36.4	10/18.2	55	5	30	35

Table 13

Grid 170N/130W - Chi-square - Initial Collapse

Level	Red Glaze	CERAMICS			FAUNA				
		Black-on-White	Four Cell X <sup>2</sup>	P	Large Mammal	Small Mammal	Bird	Four Cell X <sup>2</sup>	P
1A	126	67	.70		19	33	17		.001
2A	101	60	.07		60	27	40		.25
2B	86	78	.60		82	48	41		.30
2C	68	72	.06		35	16	29		.035
2D	29	55			25	20	10		

had hoped to use the fill below the floor of room 60 to get an idea of the date of this section relative to other parts of the site. Arbitrary levels 5A-5D of .5 foot each were removed to bedrock which averaged 5.72 feet BD. No floors or offset walls were discovered, but a possible activity surface of hard-packed dirt was found in level 5C. Within 5C we encountered a localized configuration of bison bones in the center of the room near which were two small pockets of ash and a ring of stones. It has been proposed that these stones may have been part of the masonry walls of the room 107 complex which had been purposefully leveled in order to build room 64, the more recent kiva. A heavy concentration of burnt corn kernels were found in the southeast corner of the room most prevalent in level 5C. However, the fill in levels 5A-5D were certainly not typical of trash fill. Actual debris was relatively sparse. With a sample of 43 decorated sherds, the percentage of redwares is 55.8%, while that of Black-on-white is 44.2% for the total subfloor fill.

The west masonry wall of room 107 was exposed to bedrock during this excavation. It was interesting to observe that the masonry of this wall is very thick and massive and that it is superimposed on bedrock. The large slab masonry footing rests either directly on the bedrock or is chinked to the bedrock with small slabs of stone or with about .1 foot of dirt fill. It is much thicker than the east masonry wall of room 107, which makes us suspect that this west wall of 107 may have served as an outer wall for the site and may have been the western limit of the site at one (early) time. Room 107 is likely contemporary with rooms 110 and 102. Room 60 was likely constructed during the remodeling period in which room 64 was built. As this is speculation on the basis of architectural remains, further excavation is undoubtedly needed in this part of the site.

#### Rooms 102 and 110

Rooms 102 and 110 had been extensively trenched during the 1974 season (Loose 1974:66) and had been previously excavated to some degree (in 1974, a nail and a 2x4 were discovered while trenching). To correlate the trash sample from 20N/0W with the architecture and its ceramic frequencies of the northwestern portion of the site, we excavated that which remained in rooms 102, 110, and 60.

We began excavation of room 102 with two sections of the slab-lined floor 4B. (The 4A floor, made of adobe, had been removed in 1974.) In total, the remaining 4B floor only covered areas of 2.25'x1.25' and

1.5'x4.75'. One Glaze A sherd and one Galisteo Black-on-white sherd were associated within the floor. Levels 6A through 6F were then removed to bedrock, which averaged 7.73 feet BD. Combined, the fill below floor 4B of room 102 gave a total of 11 painted sherds, 18.2% of which were redwares and 81.8% of which were Black-on-white, a ratio common to initial occupation rooms.

Room 110 also had its floor (4A) exposed when we began this year. This floor was also slab-lined, and was located 1.5 feet below 4B of room 102. Only a portion of the whole of room 110 is exposed within 102, but it is suggested, by the horizontal evenness of the north and west masonry walls of room 110 that this room had been purposefully leveled in order to build room 102. The walls did not show signs of erosion. A total of five decorated sherds from levels 5A through 5E of room 110 (above bedrock) are red and Black-on-white wares in a 20%-80% proportion, respectively, which is nearly the same proportion as the fill below floor 4B of room 102. These quantities of ceramics do not constitute a reliable sample, so relative dating of these rooms to the rest of the site is still tenuous. We may propose that rooms 102 and 110 were of an initial occupation of the northwest part of Tijeras Pueblo by the evidence that the masonry walls of room 110 were built on bedrock and that there appears to have been remodeling. These rooms were probably contemporary with room 108, the earlier kiva, since room 110 seems to be part of an "L"-shaped room block, room 107 of which was purposefully leveled in order to build room 64 (Loose 1975:66-67). Room 107 rests directly on bedrock (see summary of room 60, this report).

#### Room 108

Room 108 was discovered toward the end of the 1974 field school session as a result of the excavation of the ventilator of room 64 (kiva) (Loose 1975:67). Test trenches were dug along the south and part of the west and east walls of 108 that year, exposing the southern half boundaries of very large proportions (21'x23') in comparison to presumed living rooms. It was proposed, then, that room 108 was also a kiva (by its size) and was earlier than room 64 (by the fact that the ventilator of 64 was built into the fill of room 108). Further excavation and initial tree-ring dates of room 108 confirm this.

This season we began excavation of the total area of room 108 with level 2A, as the surface level 1A had been stripped during previous summers (1971-1973). When level 2D (5.02 feet BD) was completed,

it became apparent that we would not be able to finish excavation of room 108 in the time remaining, so we continued to excavate only the eastern half of the room, east of the 004W grid line. We chose the east half because of the probability that the kiva floor features would be oriented to the east as in room 64. This proved to be the case.

The floor (4A) was made of adobe and was severely burned. Floor depth ranged from 6.88 feet to 7.18 feet BD. Typical Rio Grande P-IV kiva features similar to those of room 64 were found: ventilator, deflector, ashpit, ashpit-firepit-divider, firepit, and oriented from east to west. Two large, corner roof support posts were also found, as well as a depressed basin feature in between the deflector and ventilator. This basin area contained a sub-floor cist partially lined with adobe and covered with wooden sticks and flat slabs of stone. Two post holes were discovered east of the deflector, at the west edge of the basin. These probably are the bases of the entry ladder. South of the deflector, embedded in the floor, was a small ceramic cup with a flat edge on its east side. It measured .18'x.05' and had stepped lines painted on its interior. Its use is unknown.

The deflector was made of adobe which had turned orange due to intense burning. The top part of the deflector had undoubtedly been cut off during excavation, for when we discovered it, it was only .34 feet high.

The ashpit and firepit were of an equal depth but the ashpit was smaller and contained very compacted white ash and a large quantity of lithic flakes, both modified and unmodified. On the north and south sides of the firepit, very large, flat slabs of stones were secured into the floor. An adobe divider similar to that in between the ashpit and firepit was found west of the firepit and extended past the 004W grid line where we had not excavated.

The ventilator opening into the kiva was not evident to us. The inner part of the east wall had collapsed during the summer, leaving us three post holes on both sides of the floor of the ventilator openings. Toward the end of the 1975 field session, exploratory probes were made to distinguish the architectural motif of the ventilator, but complete excavation of the shaft was not accomplished. The inner walls of the ventilator are masonry except for the six wooden post supports at its mouth. The shaft continues for at least 5 feet to the east.

Wall construction was primarily adobe with inner vertical wooden supports. The north wall had slumped near its center. The upright sections of the north wall showed several layers of painted plaster in varied colors including red, green, white and black. In back of the east wall of the kiva was a nice masonry wall. Whether this is part of a room to the east or supportive of the kiva wall is unknown at this time.

A collection of 23 decorated sherds from the floor of room 108 divide into 34.8% redwares and 65.2% Black-on-white, which approximates the ratio proposed for the initial occupation. Tree-ring dates from room 108 show the date of 1313 A.D. for its construction. Room 64 has tree-ring dates centering on 1390 A.D.

A 5'x3' subfloor test, T3, was sunk in the southeast corner of room 108 to look for earlier floors and/or bedrock or sterile. Two possible burned adobe floors were found in level 5A. These were localized in the southern and eastern edges of T3 only along the walls. By their discontinuous nature, we do not know for certain they were indeed floors. Excavation completed levels 5A, 5B and 5C to bedrock which ranged from 8.08 feet to 8.78 feet BD. Above bedrock were small stones, above which was a .4-foot thick adobe wash which covered the T3 area completely. Room 108, undoubtedly early, was not, then, the earliest construction at Tijeras, since it seems to have been built on an adobe wash. Redwares constitute only 13.8% of the 87 decorated sherds found in levels 5A-5C of T3.

The fill of room 108 was characterized by large quantities of trash materials, intensely burned logs and fused chunks of adobe. It may be that this kiva was purposefully burned with the help of some highly flammable substance such as animal grease, because the fusion of sand particles such as those in the adobe requires very high, burning temperatures. (The purposeful burning of unwanted rooms is not uncommon in pueblo prehistory; e.g., P-III at Chaco Canyon.) However, it is doubtful that simply the kiva roof on fire could produce such damage. This kiva's roof fall had an average thickness of .5 foot and was typified by the usual vigas, latillas and grass thatching.

Proportions of ceramic types from the trash fill of this kiva showed little variation (see table 15). (The decrease in sherds below level 2D reflects excavation procedure.) This homogeneity, in all likelihood, reflects a relatively short time interval of deposition. We suspect that the kiva was filled in for remodeling purposes, that

Table 14

Trash Profile, Room 108, T3

Level	Red-Wares n/% of Decor.	B/W Wares n/% of Decor.	Los Lunas Smudged	Total	Util.	Large Mammal n/%	Small Mammal n/%	Bird	Total	Tools & Mod. Flakes	Unmod. Flakes	Total
5A	8/12.3	57/87.7	10	253	328	4/25.0	11/68.8	1/06.3	16	2	10	12
5B	4/19.0	17/81.0	4	153	178	3/11.5	21/80.8	2/07.7	26	3	7	10
5C	0/00.0	0/10.0	2	12	15	1/50.0	0/00.0	1/50.0	2	0	2	2
Total	12/13.8	75/86.2	16	418	521	8/18.1	32/72.7	4/09.0	44	5	19	24

Table 15

Trash Profile - Room 108

Level	Red-Wares	B/W Wares	Los Lunas	Large Mammal n/%	Small Mammal n/%	Bird	Total	Tools & Mod.	Unmod.	Total
	n/% of Decor.	n/% of Decor.	Smudged Util.					Flakes	Flakes	
2A	241/70.8	99/29.1	18	1712	2070	25/08.2	259/85.7	18/05.9	302	1
2B	302/70.5	126/29.4	18	1778	2224	41/15.0	210/76.9	22/08.1	273	43
2C	188/73.1	69/26.9	8	1098	1363	21/06.7	268/84.4	25/07.9	314	29
2D	209/68.8	95/31.3	19	1173	1496	37/10.3	284/78.8	39/10.8	360	24
2E	45/57.7	33/42.3	11	443	532	10/10.3	78/83.9	5/05.4	93	3
2F	39/52.7	35/47.3	9	371	454	5/10.6	38/80.8	4/08.5	47	5
3A	90/51.9	97/48.1	23	892	1102	10/01.9	63/69.2	18/19.8	91	4
4A	8/34.8	15/65.2	8	193	224	4/05.1	53/67.0	22/27.8	79	39
									60	178

is, for the building of room 64 and its associated room block. The fact that the percentage of redwares in the fill ranges from 52% to 73% suggests that room 108 was filled during the reoccupation period of this section of the pueblo, corresponding to the middle phase of the blade cut region.

The 1391 date for room 64 has obvious implications for the logical placing of room 64 in the chronology of Tijeras. Room 64 was probably associated with the reoccupation period correlating with the fill of 108 and the levels above the adobe wash in grid 20N/0W. The interpretation presented earlier in this paper in regards to rooms 102, 107, 110 and 60 and their relationship to 64 may have to be modified. The construction of rooms 107 and 110 on bedrock can still be taken to mean they are initial in occupational sequence. What has to be examined further is the relation of 102 to 110 and of 64 to 107. I suggest that masonry walls, by their very nature, will not be subject to as devastating erosion as adobe walls are. Thus, in this case, we may be seeing rooms which had been abandoned (107, 110) but whose masonry walls had stood, at least partially, at the time of reoccupation. During the ensuing new building phase, what were left of the masonry walls were leveled in order to build 102 and 64.

By comparison to room 64 (13.5'x18'), room 108 is quite a large kiva (21'x23'). Associated with the initial occupation period, the size of room 108 may be correlated to the size of the population or to the degree of its social solidarity at that time. We have suggestions from the room 107 complex, from the blade cut area, from trenching, from Room Block I, and from the amount of trash in 100S/30E that the initial occupation of Tijeras Pueblo may have been the most extensive, so the former hypothesis may be supported. However, the degree of social solidarity may be impossible to discern in the archeological record to test the latter hypothesis.

#### Trench E

Trench E (Map 3) was established in order to define the northwestmost limit of the initial or middle occupation room block discovered in the blade cut. A cross-wall of adobe had been discovered by Group II in a portion of trench A at roughly 37N. Thus, trench E was to try to follow the E-W wall westward. Two more sets of E-W and N-S adobe walls were discovered at various depths ED. The farther west we dug, the deeper we had to dig in order to find walls. This seems a highly logical pattern of weathering: the outermost

rooms of a pueblo are faced with the most harsh erosional forces. The westernmost wall running N-S was discovered at approximately 28E, at 9.12 feet BD. The trench was extended to 20E and to a depth of 9.6 feet BD, but no further evidence of architecture was found; it was purely trash.

The westernmost wall was composed of an outer wall of adobe, buttressed on the interior masonry. We sunk a test straddling this wall and found a floor surface made of small cobble-sized rocks at 10.77 feet BD. Wet digging conditions hindered the recognition of a clay floor directly above the rubble surface, but this was easily discerned in the test pit's walls, so it appears that the small stones were actually footing for the clay floor. The clay floor was measured at 10.62 feet BD, placing it almost level to one floor of room 119. Since this floor of this room which we have called 122 was not completely excavated (4'x3'), ceramic frequencies cannot be used as yet to ascribe an accurate occupational time to the room. Excavation of one foot below the cobble footing turned up very little cultural material (five plainware sherds) and sterile soil at 11.77 feet BD.

The clay floor and cobble surface of room 122 were discovered to extend underneath the inner masonry wall of the west wall, implying that the large stone wall was built after initial occupation of the room, probably to buttress the outer adobe wall. This is atypical of most pueblo architecture. The planned completion of room 122 next year will give us more information about the architecture and hopefully about its occupation phase.

#### Trench F

Excavation of trench F (Map 3) was initiated and completed in a project paralleling that of trench E. We had hoped to find the north-easternmost extent of the room block discovered in the blade cut. We found an adobe wall bordering a slab-lined floor to its east. The wall ran N-S at roughly the 86E grid line. Average depth of the floor was 11.28 feet BD. The slab-lined floor was not continuous within its expected limits within the trench. Two human burials were found in trench F, which may explain the floor disturbance. Number 1-30N/80E-1A-T1-B1 was discovered with its skull resting on top of a slab while the rest of its body was below floor surface with no slabs above or below it. Likewise, B2 was found below floor level with no slabs above or below it.

The area east of the adobe wall was excavated another 1.5 feet deeper, but only trash was encountered, suggesting that we had indeed found the northeast limits of this room block.

A 3'x3' test pit, T3, was sunk below the floor in the west part of the trench to determine whether this room (no room number designation) had been constructed on sterile. The test exposed about one foot of adobe wash directly below the floor. Below the wash, over 2' of trash were encountered before reaching sterile soil at 15.13' BD. Combined, levels 5A through 5G of T3 contained 11.9% red-wares. Thus, it is likely this room was part of the middle occupational phase, but we cannot confirm this proposition with ceramic frequencies from the floor, as there was no discrimination of floor fill.

#### Trench G

Two adobe walls aligned N-S were uncovered at 34E and at 40.1E at 10.78 feet BD. A contiguous adobe wall was found running E-W along the southern edge of the trench, from 20E to 34E at 9.78 feet BD. In the west end of trench G, we discovered bedrock covering an area of 5'x3' at 11.53 feet BD (deepest point, southwest corner). The rest of the trench was excavated to a depth of 11.78 feet BD, at which point it was decided to stop since the above-mentioned walls had been found.

This room block is probably associated with the initial phase by the depth at which we encountered the highly eroded walls. These walls' alignment seem to correspond to the probable initial occupation walls discovered in trenches B, C, and H. The fill in levels 2C, where bedrock was discovered, through 2E present us with ratios of red to Black-on-white which are typical of initial occupational phase:

Level		<u>Red</u>	<u>B/W</u>
	2C	45.2%	54.8%
	2D	31.9%	68.1%
	2E	36.0%	64.0%

Two human burials, likely associated with one another were taken out of the trench from above bedrock. Burial #1-40S/20E-2a-T1-B1 was an adult whose skull and mandible were missing. At nearly the same horizontal coordinates but .55 foot below B1, we found an infant burial whose lower parts were also missing.

The westernmost extent of the initial phase in this central part of the pueblo was not determined by trench G. Trench G was not extended to the west because of the backdirt pile from room 108. Since early rooms built directly on top of bedrock (rooms 107, 110) had been found, we postulate that the initial building phase may have extended as far west as grid line 40W, but room construction must have been restricted by the location of outcroppings of bedrock.

#### Trench H

Trenches B and H (map 3) exposed contiguous and parallel adobe walls which seem to connect the rooms of Room Block II to those of Room Block V. The same occupation period is implied by architectural scheme and depth.

In trench H, we found an E-W adobe wall at grid line 56S which was associated with a narrow horizontal adobe surface and small adobe ridge to the north of the adobe surface and wall. Inches below this adobe surface and ridge, a complete slab-lined floor was discovered at 13.26'-14.41' BD (due to slope of floor), contiguous to the ridge. The floor extended from 55S to the end of trench H at 45S. Its northern contiguous wall was not convincingly found.

The ratio of 76.9% redwares and 23.1% Black-on-white from the slab-lined 4A floor fill suggests that this room belongs to the middle occupational phase. This proposition is strengthened by the evidence of 2.5 feet of sparse trash in a 2'x3' test pit, T3, below the floor. A total of one Glaze A and six Black-on-white sherds do not give an adequate sample for relative dating of the fill. Sterile, typified by the red-purple clay found elsewhere on the site, was reached at 17.26 feet BD.

The test trench was extended south another 10 feet to determine whether the architectural configuration discovered in the rest of trench H was contiguous with Room Block V. A set of cross-walls was discovered at 13.9 feet BD, connecting Room Block II with Block V by inference from the evidence of parallel room walls. Featured in these cross-walls was a possible plugged doorway in the N-S wall.

Since we dug to and below floor of only one segment of a room within this trench, the occupational period of the connecting rooms is not confining, though middle phase is likely by virtue of ceramic frequencies associated with the floor.

## Summary

During the 1975 session, we were primarily concerned with the broad reconstruction of the building and occupational history of Tijeras Pueblo. The trash excavations resulted in the successful acquisition of adequate samples for inter- and intra-site comparisons of ceramic frequencies. Preliminary analysis of the trash material from grid 20N/0W suggests that there was an abandonment of the northwest portion of Tijeras Pueblo (e.g., rooms 107, 108, and 110) just before redwares reach 50% of the decorated wares. After a very short period of time, there is a reoccupation of the same area of the site, when redwares constitute 65% of painted wares. This reoccupation is probably reflected by rooms such as 60, 64 and 102, though possibly by the surface rooms 17, 8, 7 and 1 which are no longer visible except, in some cases, by the masonry footings of their walls. Trash from 170N/130W, the outlier to the northwest, gave us a 2.5-foot sample which ranged from 35% to 65% redwares.

Excavation of room 108 was undertaken to prove that it was a kiva and to try to place it in the building scheme of the pueblo. We can feel assured that these goals were met even though we could only excavate half of the room. We have proposed that room 108 belongs to a late manifestation of the initial period.

Rooms 60, 102 and 110 were excavated to bedrock. It is apparent that they were involved in some remodeling and/or abandonment and reoccupation in the northwest part of the site. Further excavation of rooms in this area is necessary for more supported statements than those in this text.

Trenches E through H were initiated in order to discern the configuration of subsurface architecture and its probable building phase. The results were nonidentical and interesting (table 16). Trenches E and G seem to have revealed initial occupations while F and H may be related to the middle phase.

Table 16  
Miscellaneous Ceramic Frequencies

Provenience	Level	Redwares n/%	Black-on-white n/%
Room 60	5's	24/55.8	19/44.2
Room 102	4B	1/50.0	1/50.0
	6's	2/18.2	9/81.8
Room 110	4A	0/00.0	1/100.0
	5's	1/20.0	4/80.0
Room 122	1A	71/80.7	17/19.3
	2A	5/83.3	1/16.7
	2B	4/44.4	5/55.6
	2C	1/25.0	3/75.0
	2D	31/47.7	34/52.3
	4A	0/00.0	1/100.0
	5A	0/00.0	1/100.0
Trench F: 30N/80E	T1-1A	149+/74.5	51/25.5
	T3-5A	1/33.3	2/66.7
	T3-5B	2/20.0	8/80.0
	T3-5C	3/23.1	11/76.9
Trench G: 40S/40E	1A	198+/54.7	164/45.3
	2A	141+/67.1	69/32.9
	2B	88/69.8	48/30.2
	2C*	56/45.2	68/54.8
	2D	22/31.9	47/68.1
	2E	27/36.0	48/64.0
Trench H: 40S/40E	T1-1A	85/89.5	10/10.5
	T1-2A	99/92.5	8/07.5
	T1-2B	31/86.1	5/13.9
	T1-2C	51/75.0	18/25.0
	T1-2D	69/72.0	26/28.0
	T2-2E	47/74.6	16/25.4
	T2-2F	27/75.0	9/25.0
	T2-4A	20/76.9	6/23.1
	T3-5A	1/100.0	0/00.0
	T3-5B	0/00.0	3/100.0
	T3-5C	0/00.0	3/100.0
	T3-5D	---	---
	T3-5E	---	---

+Level located above bedrock.



### Bibliography

Burkhart, Greg C.

n.d. "Tijeras Pueblo - 1975 Field Season. Final Report on Excavation by Group II." Submitted August 1975. UNM

1975 Appendix C to L.S. Cordell The 1974 Excavation of Tijeras Pueblo, Arch. Report No. 5, USDA Forest Service, Southwest Region, Albuquerque, 45-55.

Cordell, L. S.

1975 The 1974 Excavation of Tijeras Pueblo, Arch. Report No. 5, USDA Forest Service, Southwest Region, Albuquerque.

Judge, W. James

1974 The Excavation of Tijeras Pueblo 1971-1973: Preliminary Report, Arch. Report No. 3, USDA Forest Service, Southwest Region, Albuquerque.

Loose, Ann A.

1975 Appendix D to L.S. Cordell The 1974 Excavation of Tijeras Pueblo, Arch. Report No. 5, USDA Forest Service, Southwest Region, Albuquerque, 56-68.



### Footnotes

Considerable gratitude is here extended to Marcia Lubar, who so helpfully has given precious time and effort to take and develop radiographs of prehistoric long bones.

- 1/ This index ranges from 77.6 to 98.2 in pueblo males (mean is 90.4) and from 89.8 to 111.7 in pueblo females (mean is 101.9). Compare these values to means of 90.4 for white males and 104.2 for white females, according to Genoves (Olivier 1969:250).
- 2/ Initially noticed by Dr. Carlos Garcia-Moral, Orthopaedic Surgeon, then of the Bernalillo County Medical Center, Albuquerque, New Mexico.
- 3/ I wish to give a special note of appreciation to the students who collected most of the data discussed in this report. They were S. Bingham, R. Birnbaum, D. Bovenkerk, L. Cohen, M. Ebbinghouse, P. Ellis, A. Forrister, D. Hill, G. Jarahian, H. Landsman, J. Levin, J. McGowan, B. Moore, P. Nash, S. Piszkin, E. Rose, K. Russel, K. Simmons, and G. Turnquist.
- 4/ The 4A floor of room 118 is an exception. Ceramic percentages in this room may be skewed by mixture with those from overlying room 115.
- 5/ There is some question as to the placement of rooms 116 and 119 with this occupational phase. I have tentatively placed the 4A and 4C floors of 116 and the floor of 119 with this level due to ceramic frequencies and wall alignments.
- 6/ Please see "Note on the Excavation of Trash Profiles" at the close of this report.



THE ARCHEOLOGICAL SURVEY OF TIJERAS CANYON

By  
Byron B. Blevins  
and  
Carol Joiner



## Contents

	<u>Page</u>
I. Introduction	126
II. The Environment of Tijeras Canyon	127
III. History of Archeological Research Within the Survey Area	129
IV. Survey Methods	135
V. Survey Results	138
VI. Conclusions	146
VII. References	150
VIII. Appendices:	153
I. Individual Site Data	153
II. Site Locations According to Ceramic Group	164

## Charts:

1. Significantly Related Ceramic Types and Subdivisions
2. Site Type and Number vs. Time
3. Site Type and Area vs. Time
4. Site Number Through Time vs. Vegetation Density
5. Distance of Sites from Perennial Water



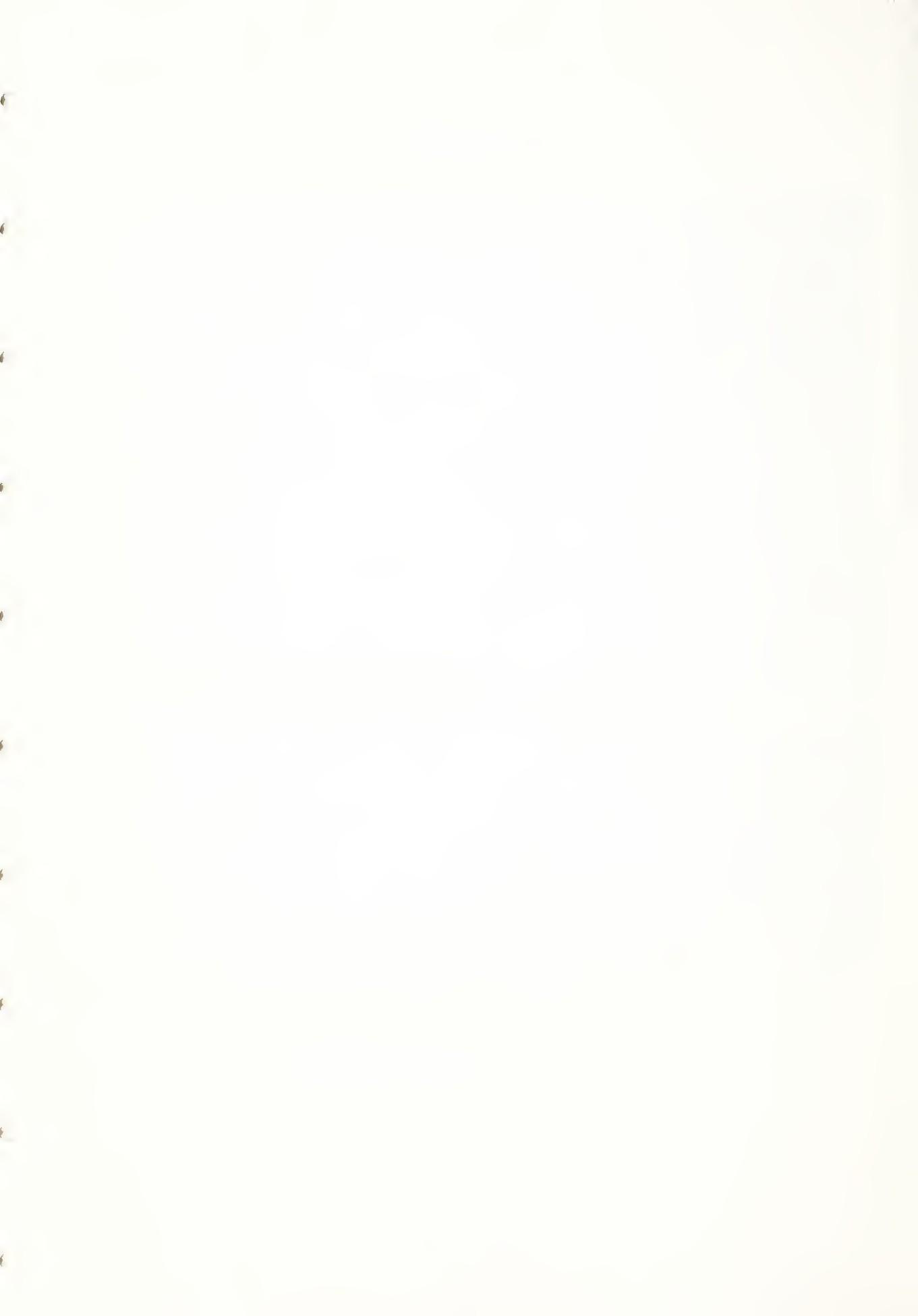
## I. Introduction

The University of New Mexico's Field School in Archeology began its current work at Tijeras Pueblo (L.A. 581) in 1971. The research design, as expressed by my predecessor (Judge 1974) and subsequently modified (Cordell 1976), has focused on first explicating local population dynamics and second, determining the extent to which population fluctuates related to variations in resource abundance. Although excavation of a single site may provide relevant demographic, paleoclimatic and subsistence information, few meaningful statements about either the magnitudes of prehistoric populations or their food resources may be made from the perspective of a single site, with, in this case, an occupational history spanning only one century. The need for contextual information was immediately apparent. Given the proximity of Tijeras Canyon to the urban center of Albuquerque, it was surprising to us that no comprehensive archeological survey of the canyon had previously been made. Perhaps Tijeras Canyon is too close to be glamorous, or perhaps the nonspectacular nature of its archeological remains discouraged intensive investigation. Whatever the case, a potentially fascinating archeological area had been virtually ignored. Thus, the field school initiated the first comprehensive survey of the area.

The survey was begun on a very limited scale in 1974 and completed in 1975 with the invaluable assistance of matching funds from the New Mexico State Planning Office (Project Number 35-75-00047.2). As project director of both the field school excavation at Tijeras Pueblo and the survey, and with both projects running concurrently, I could not be in two places at once. Although I assumed ultimate responsibility for the survey, coordinated survey crews and prepared preliminary reports, I turned the immediate supervision of the survey over to the two very competent writers of this report.

Results of the survey are reported in detail in the following pages.

Linda S. Cordell



## II. The Environment of Tijeras Canyon

The Sandia and Manzano Mountains in north-central New Mexico are fault-block ranges composed largely of Precambrian granite and Pennsylvania limestone. Running generally north-south, they parallel the Rio Grande River which flows about 20 miles west of them. Due to the tilting of the blocks which formed them, the west face of the mountains is considerably more steep and rugged than the east face, resulting in a marked difference in appearance and vegetation. The forest on the east face is denser and more continuous, although the west face also has good timber stands, particularly on its upper third. The impressive escarpment of the western Sandias, so apparent from Albuquerque, has an average height of 4,000 feet, ranging from about 6,000 feet in elevation at its base to 10,678 feet at Sandia Crest (Kelley 1969:4-6).

This rapid increase in altitude allows the existence of four of New Mexico's six life zones, from the Upper Sonoran to the Hudsonian, within a relatively short distance. Each zone is characterized by plants and animals which are distinctive to it (Martin 1971:vi), with the result that there is a high species diversity in a fairly small area. This diversity was presumably of great importance to the prehistoric inhabitants of the area.

Located just east of Albuquerque, Tijeras Canyon is the major pass through the Sandia and Manzano Mountains. Thus, the canyon forms a natural link between the Estancia Basin to the east and the Rio Grande Valley to the west. Although the canyon floor is located at an altitude of about 6,400 feet, the surrounding area has a great deal of physiographic relief. Most of it lies in the Upper Sonoran and Transition life zones, but the Canadian and Hudsonian life zones are also accessible from the canyon (Judge 1974:3).

Of the life zones in the Sandias and Manzanos, the lowest in elevation is the Upper Sonoran. Allowing for differences in rainfall, exposure, and topography, as well as elevation, it is found from the base of the mountains to about 7,200 feet. It is sometimes known as the pinyon-juniper zone, because its characteristic vegetation is dominated by these two trees. Buffalo grass and sagebrush are also abundant, as are cottonwoods along the arroyos. Some of New Mexico's most valuable grazing and ranching land is located in this zone; in Tijeras Canyon, most of the arable land is in it. Among the animals commonly found in the Upper Sonoran

zone are coyotes, deer, jackrabbits, cottontails, bobcats, and numerous birds (Martin 1971:vi, Ugnade 1972:24, Smylie n. d.).

The Transition zone, which goes to about 8,500 feet, contains much of New Mexico's timber reserves. It is characterized by ponderosa pine, Rocky Mountain juniper, and white fir. In addition, there is oak, wild plum, locust, gooseberry, currant, wild rose, and strawberry. Animals living in the Transition zone include deer, black bear, turkey, and many songbirds (Martin 1971:vi, Ugnade 1972:24).

In the Sandias and Manzanos, the Canadian or mixed conifer zone extends to about 9,200 feet, and is distinguished by an abundance of quaking aspen and Douglas fir. Mule deer, bobcat, gray fox, and porcupine are found here (Martin 1971:vi, Smylie n. d.).

The Hudsonian or spruce-fir zone extends from 9,200 feet to timber-line. Engelmann spruce, bristlecone pine, cork-barked fir, and limber pine distinguish it from other zones. Receiving much snow-fall, it has luxuriant vegetation. Its meadows are grazed by Rocky Mountain bighorn sheep, the most characteristic animal of this zone (Martin 1971:vi, Ugnade 1972:24-25).

Despite its generally arid appearance, there are some sources of perennial water in Tijeras Canyon and the nearby mountains. The most important of these are San Antonio Arroyo and the main wash of Tijeras Canyon. The fact that two of the canyon's largest Anasazi sites, San Antonio (L.A. 24) and Tijeras Pueblo (L.A. 581), are located near these sources suggest a prehistoric importance as well. The canyon also contains a good number of springs, Carlito Spring and Seven Springs perhaps being the best known today. Locations of the sites, probably including most residential sites, are near streams or springs. Some, like L.A. 581, are near both. It can also be seen that the generally dry eastern part of the canyon has fewer sites than the wetter portion (Blevins 1974, 1975; Joiner 1975).

In addition to water, arable land, and a great variety of plants and animals, Tijeras Canyon and the nearby area has an abundance of geological resources. There is limestone and sandstone for building good clay soil for adobe, siliceous rock for chipped stone tools, and even malachite for esthetic uses (Loose 1974). By going somewhat farther away, many resources could be exploited; e.g., chalcedony from the West Mesa near Rio Rancho (W.J. Judge, personal communication, 1975). Even without considering the

possible benefits of Tijeras Canyon as a travel and/or trade route, as it may have been, it can be seen that it is an area from which the resources of several different life zones and geological regions can be utilized. It is generally assumed that this accessibility to a wide range of plant, animal, and geological resources made Tijeras Canyon and the surrounding area attractive to the prehistoric inhabitants of New Mexico (Judge 1974:3).

### III. History of Archeological Research Within the Survey Area

Archeological sites at Tijeras Canyon have been investigated intermittently for the past 50 years. During this period, most research concentrated on those sites which are large and easily accessible. Results obtained from such work were filed with either the Laboratory of Anthropology in Santa Fe or Anthropology Department of the University of New Mexico.

The first site recorded in the surveyed area is L.A. 24 (TCS-133). Its location had been common knowledge to local residents and was officially noted by the Laboratory of Anthropology during 1930. If site testing was carried out, no record of results exists (Dana Anderson, personal communication, 1976).

A year later, H. P. Mera visited the canyon and located an additional four sites. Decorated wares noted for each included (Laboratory of Anthropology 1976):

L.A. 580  
(TCS-127): Red Mesa Black-on-white, Socorro Black-on-white, Santa Fe Black-on-white, Los Lunas Smudged, Wiyo Black-on-white, Wingate Black-on-red, Kotyiti Glaze Polychrome, Tsia Polychrome, Red Tewa Ware, Black Kapo Ware, and European Fragments.

L.A. 581  
(TCS-053): Santa Fe Black-on-white, Galisteo Black-on-white, Socorro Black-on-white, Tularosa Black-on-white, Chupadero Black-on-white, Los Lunas Smudged, Agua Fria Glaze-on-red, Heshotuathla Polychrome, Los Padillas Glaze Polychrome, San Clemente Glaze Polychrome, and Arenal Glaze Polychrome.

- L.A. 583  
(TCS-128): Santa Fe Black-on-white, Galisteo Black-on-white, Socorro Black-on-white, Chupadero Black-on-white, St. John's Polychrome, Los Lunas Smudged, and San Jose Black-on-white.
- L.A. 586  
(TCS-129): Red Mesa Black-on-white, Galisteo Black-on-white, Santa Fe Black-on-white, St. John's Polychrome, Brown Alma Ware, and Upper Gila Smudged.

In addition, Mera indicated that 13 structures existed at L.A. 581, and mapped the location of each (Judge 1974:4-16). Further work at L.A. 581 included visits by W. S. Stallings in 1931 and 1933 for the purpose of extracting tree-ring samples. Twenty-seven samples were collected and resulting dates published in 1972 (Robinson et al., 1972). Judge (1974:4-16) points out that these samples were probably taken from Mera's Mound A (TCS-053), and point toward a construction period for the site of about A.D. 1390.

During 1932, L.A. 846 (TCS-130) was located among the houses of Tijeras Village. Positioned at the northern edge of the canyon bottom, it was found underlying a modern house. Decorated ceramics exhibited by the site included Red Mesa Black-on-white, Tsia Polychrome, Tewa Wares, Acoma Polychromes, and European fragments (Laboratory of Anthropology, 1976).

The next year, L.A. 1279 (TCS-012) was noted in the same general area. Its position was the south side of Tijeras arroyo immediately opposite the west end of Tijeras Village. In this case, decorated wares discovered were Socorro Black-on-white, Chupadero Black-on-white, Jornado Ware, Santa Fe Black-on-white, Galisteo Black-on-white, Wingate Black-on-red, Los Lunas Smudged, and Puaray Glaze Polychromes. However, 3 years later, another site was recorded with almost exactly the same descriptive location. Numbered L.A. 2021, associated decorated wares were identified as Red Mesa Black-on-white, Santa Fe Black-on-white, Agua Fria Glaze-on-red, Los Lunas Smudged, Chupadero Black-on-white, Tewa Polychromes, Tuguex Glaze Polychromes, Tsia Polychromes, Acoma Polychromes, and European fragments. Based on ceramic collections made by the UNM survey, and close examination of the actual site in question, it is felt that L.A. 1279 and L.A. 2021 are one and the same (TCS-012) (Laboratory of Anthropology, 1976).

Not until 1940 were any new sites recorded in the canyon. Regarding the first, L.A. 4439 (TCS-131), Laboratory of Anthropology records show only a location. In an attempt to determine a specific site type and temporal placement, the UNM survey learned that construction in the immediate vicinity had uncovered a number of prehistoric graves (J.D. Grenko 1974, personal communication). Since the supposed "burial ground" now underlies the Ideal Cement Company service garage, it is presently not possible to test the validity of this statement. However, two factors do offer some support: (1) in 1975 a prehistoric burial was discovered in a road cut 100 meters to the southeast, and (2) a modern cemetery lies adjacent to L.A. 4439's presumed position. (Modern churches and cemeteries within the canyon are invariably associated with some type of prehistoric feature.) The only ceramic type associated with the burial recovered in 1975 was Pitoche ware.

The other site reported at this time was L.A. 4440 (TCS-001). A profile of decorated wares from this site does exist and is as follows: Santa Fe Black-on-white, Chupadero Black-on-white, St. John's Polychrome, Puname Polychromes, Tewa Polychromes, Kapo Ware, and European fragments (Laboratory of Anthropology 1976).

In 1948, the first formal excavations were carried out in Tijeras Canyon. In conjunction with the University of New Mexico Field School, Stanley Stubbs directed excavations at L.A. 581, and Fred Wendorf did likewise at L.A. 586 (TCS-129). Architectural components tested by Stubbs included Mera's Mounds A through E (TCS-053), TCS-060, TCS-061, and TCS-064. As a result, pithouses were supposedly discovered in conjunction with the Tijeras Pueblo grouping. In his survey of 1972 D. H. Snow pointed out that Wendorf apparently excavated three rooms at L.A. 586 (Vulture Gulch) (Laboratory of Anthropology 1976). The UNM survey also examined the site and was in complete agreement with Snow's findings. Records for the 1948 field school exist only in the form of student notebooks. Site maps have not been located. Cultural material recovered was presumably stored at the Laboratory of Anthropology in Santa Fe.

At the beginning of 1950, "independent" excavations were carried out at the Carlito Springs area of Tijeras Canyon. Apparently, anthropology graduate students from the University of New Mexico partially excavated at least two sites (TCS-081 and TCS-098) (J.D. Grenko 1975, personal communication). Neither were officially reported and remained unknown until the UNM survey.

Also in the 1950's, the Laboratory of Anthropology shows the addition of two sites to its records: L.A. 6906 and L.A. 6907. Site descriptions were provided, but the standard list of decorated wares was absent. Based on these descriptions, it is likely that both sites represent an inadvertent renumbering of L.A. 580 (TCS-127) and L.A. 586 (TCS-129).

Research in the canyon was not resumed again until 1968. An expansion of U.S. Forest Service facilities necessitated the total excavation of Mera's Mound H (TCS-065) at L.A. 581. Supervised by Stewart Peckham for the Museum of New Mexico, a  $14\frac{1}{2}$ -room structure was excavated. Decorated wares were found to be predominantly Galisteo Black-on-white and Agua Fria Glaze-on-red.

Salvage work was continued at L.A. 581 into 1969. Mera's Mound M (TCS-062) lay in the path of a proposed U.S. Forest Service utility road and, as a consequence, was extensively trenched by D.H. Snow. Once again, a Museum of New Mexico project, all collections are stored at the Laboratory of Anthropology and have not yet been re-examined. Subsequently, the Forest Service rerouted the intended road and bypassed the site (Judge 1974:4-16). A reexamination of Mound M by the UNM survey revealed that major decorated wares consisted of Santa Fe Black-on-white, Galisteo Black-on-white, Agua Fria Glaze-on-red, and Glaze A Polychromes.

Under direction of Dr. W. James Judge, the University of New Mexico Field School carried out further excavations at L.A. 581 from 1971 through 1973. Mera's Mounds A (TCS-053), F (TCS-064), and K (TCS-059) were the areas subject to testing. Findings indicated that Mound A was a 120-130 room pueblo temporally spanning the Coalition and Classic periods of Rio Grande prehistory (Judge 1974).

During 1972, D.H. Snow conducted an archeological survey for the Museum of New Mexico. Its purpose was to locate all sites within Interstate 40's proposed right-of-way. Previously known sites relocated by Snow included L.A. 580 (TCS-127), L.A. 583 (TCS-128), L.A. 586 (TCS-129), and L.A. 4440 (TCS-001). With regard to L.A. 586, Snow notes that pithouses possibly exist southwest of the site and a field house to the southeast (Snow 1972). The UNM survey noted an horno at the field house structure indicating that it belongs to the historic period. Ceramics found in the area of the pithouse did indicate an early date for the feature. Snow was denied permission to examine L.A. 580 (TCS-127). He did view

L.A. 583 (TCS-128) and L.A. 4440 (TCS-001), noting that both had been destroyed. The UNM survey found sherd and lithic scatters at both sites, as well as structure remnants at L.A. 4440. Of the four sites, only the pithouse area of L.A. 586 was within the right-of-way of Interstate 40 (Snow 1972).

Snow also discovered three previously unrecorded sites endangered by proposed construction (Snow 1972). The first, L.A. 10792 (TCS-134) consisted of a PII-PIII village with an unknown number of rooms and possible pithouses. L.A. 10793 (TCS-034) was described as a possible Archaic chipping site just south of U.S. Highway 66. Portions of this site were located on the northern edge of 66 by the UNM survey and Glaze II ceramics were found associated with the lithic scatter. As in the case of L.A. 10792, L.A. 10796 (TCS-132) exhibited PII-PIII surface ceramics and represented another possible pithouse grouping.

Laboratory of Anthropology files show that in 1973 a small survey was carried out by Stewart Peckham along State Highway North 14. This work determined the location of four new prehistoric sites: L.A. 11612 (TCS-137), L.A. 11613 (TCS-138), L.A. 11614 (TCS-139), and L.A. 11615 (TCS-140). Decorated wares were not extensively examined, but the temporal placement for each site was listed in the following manner:

- L.A. 11612: Anasazi and Historic, PIII-PIV
- L.A. 11613: Anasazi and Historic, PIII-PIV
- L.A. 11614: Anasazi, PIV
- L.A. 11615: Anasazi, BMIII-PI

The 1974 University of New Mexico Field School continued work at L.A. 581 under the direction of Dr. Linda S. Cordell. During the season excavation centered exclusively on Mera's Mound A (TCS-053) (Cordell 1975). Efforts were made to determine the site's early architectural extent, as well as its total occupational history.

Also in 1974, the University of New Mexico archeological survey of Tijeras Canyon was initiated (Cordell 1975:appendix E). Within a 5-square-mile area, 66 sites were located where only 16 had been previously recorded. In addition, it was discovered that Mera's Mounds J and L at L.A. 581 (TCS-054, TCS-055, and TCS-056) were actually a single structure approximately 1/4 the size of Mound A (TCS-053).

Archeological research reached its peak at the canyon during 1975. Work at L.A. 581 determined that the site's earlier occupations were larger than anticipated. Tests were also conducted by the field school at Mera's Mounds L and I (TCS-054 and TCS-058, respectively). Decorated wares exhibited at Mound L included Los Lunas Smudged, Socorro Black-on-white, Chupadero Black-on-white, Santa Fe Black-on-white, Galisteo Black-on-white, Glaze A Polychromes, Agua Fria Glaze-on-red, and Cieneguilla Glazes. Testing at Mound I revealed a large subsurface, circular structure with surface ceramics similar to those of Mound L. (Cieneguilla Glazes were absent and traces of Red Mesa Black-on-white were present.) Fill thus far examined is for the most part sterile, but masonry wall construction and a compact, partially burned clay floor indicate that it is probably a kiva. Further work on this feature is planned for 1976 (Cordell, personal communication, 1976).

Also during the summer of 1975, the Museum of New Mexico's Laboratory of Anthropology excavated all sites endangered by proposed highway construction. The work was under the supervision of Randy Morrison. The most closely examined endangered site, L.A. 24 (TCS-133), proved to be a large site, in part contemporary with L.A. 581. But where L.A. 581 was abandoned just after the proliferation of Glaze A ceramics, decorated wares at L.A. 24 represent an occupational continuum from the Coalition Period into historic times.

The same project also involved detailed testing of the possible pit-house areas associated with L.A. 586 (TCS-129), L.A. 10792 (TCS-134), and L.A. 10796 (TCS-132). Excavation at all three indicated an absence of pithouses. However, at L.A. 586 and L.A. 10792, single room, slab-lined floors were discovered in association with quantities of ground stone. Room wall evidence at both was absent. All three areas were visited during the subsequent highway construction to determine beyond all doubt whether or not pithouses were present. None were found.

A small site located by the 1974 UNM survey (TCS-057) was tested in conjunction with excavations at L.A. 10796 (TCS-132). Results point toward either a heavily disturbed field house, or prehistoric refuse pile associated with field areas. The major decorated ware exhibited was Cieneguilla Glaze.

Finally, the UNM survey was completed during 1975. Twenty-five square miles were surveyed and 140 prehistoric sites located, an addition of 113 to the archeological record of Tijeras Canyon. Table 1 indicates the relationship between previously known sites and sites examined by the UNM survey.

Table 1

L.A. 24.....	TCS-133	L.A. 581 Mound M .....	TCS-062
L.A. 580 & L.A. 6907..	TCS-127	L.A. 583.....	TCS-128
L.A. 581 Mound A.....	TCS-053	L.A. 586 & L.A. 6906..	TCS-129
L.A. 581 Mound B.....	TCS-060	L.A. 846.....	TCS-130
L.A. 581 Mound C.....	TCS-061	L.A. 1279 & L.A. 2021 .	TCS-012
L.A. 581 Mound D.....	TCS-061	L.A. 4439.....	TCS-131
L.A. 581 Mound E.....	TCS-064	L.A. 4440.....	TCS-001
L.A. 581 Mound F.....	TCS-064	L.A. 10792 .....	TCS-134
L.A. 581 Mound G.....	TCS-063	L.A. 10793 .....	TCS-034
L.A. 581 Mound H.....	TCS-065	L.A. 10796 .....	TCS-132
L.A. 581 Mound I .....	TCS-058	L.A. 11612.....	TCS-137
L.A. 581 Mound J .....	TCS-055	L.A. 11613.....	TCS-138
L.A. 581 Mound K.....	TCS-059	L.A. 11614.....	TCS-139
L.A. 581 Mound L.....	TCS-054	L.A. 11615.....	TCS-140

Data of a general nature were also collected in conjunction with the UNM survey and are available in the field school files. These include information relating to soil types (The Middle Rio Grande Council of Governments 1974), geology (Kelly 1963), modern climate (U. S. Department of Commerce 1965), and fauna (Bailey 1913:32-46).

Specific survey data not included in this report but available in the field school files include types and locations of isolated artifacts recorded by the survey and the preliminary results of a lithic analysis of material from sites TCS-001 through TCS-099.

#### IV. Survey Methods

The term "Tijeras Canyon" commonly refers to the large natural pass between the Sandia and Manzano Mountain ranges. For purposes of the survey, the area designated by the term had to be more precisely defined. This was done by B. B. Blevins in preparation for the 1974 field season. The boundaries were drawn to include the four major topographic situations in the canyon (the floor plain,

foothills, high ridge faces, and primary and secondary canyon junctures), following the section lines on the Tijeras, Sedillo, and Sandia Park USGS topographic quadrangles (Blevins 1975:70). Of the 40 sections defined as Tijeras Canyon, 25 were included in this survey. These sections closely follow the pass and fall in what could be termed "central" Tijeras Canyon.

Ownership of the land in the 25 sections is about equally divided between the U. S. Forest Service and private landowners. In general, those sections surveyed by the field school crews (sections 13, 15, 16, 17, 20, 21, 22, 23, 24, 26, 27, 28, and 29 in Township 10 North, Range 5 East) were largely owned by the Forest Service, while those sections surveyed by the State Planning Office crew (11, 12, and 14 in T. 10 N., R. 5 E., and 4, 5, 6, 7, 8, 9, 10, 17, and 18 in T. 10 N., R. 6 E.) were largely privately owned. It is estimated that there are 1700 landowners, both public and private, in these 25 sections.

In order to request permission to enter the privately owned portions of the survey area, the names and addresses of the owners of all the lots were obtained from the computer printouts of the tax records in the office of the Treasurer of Bernalillo County. A form letter in both English and Spanish was sent to each private landowner; permission to survey the land owned by the Federal and State governments had already been granted, so it was not necessary to ask permission for each lot in public ownership. A stamped, self-addressed envelope was included in each letter, to facilitate the return of the form granting us permission to conduct the survey on the plots owned by each landowner. In response to these letters, we had a high rate of return and very few refusals.

The survey was completed in the field seasons of 1974 and 1975 and involved the use of three separate crews operating under a common supervisor. In both 1974 and 1975, a crew composed of students enrolled in the University of New Mexico summer field school surveyed 13 sections of land. These two crews were composed of seven or eight students under the direction of a paid field supervisor. In addition, a third crew of five students from the Department of Anthropology of the University of New Mexico surveyed 12 sections of Tijeras Canyon in 1975. The salaries of this crew were paid by a grant from the New Mexico State Planning Office.

Due to common direction and organization, the procedures used by the different groups in the two field seasons were quite similar and

can be described in the same terms. A first step was the purchase of the plat maps of the appropriate sections from Bernalillo County. As the permission slips were returned by the landowners, the individual plots were located on the maps and marked with a standardized color code. It was then possible to tell at a glance whether permission for a given plot had been given or refused, whether there had been no reply, or whether there were special instructions; e.g., call first. Using these maps and copies of enlargements of the USGS topographic map for the appropriate area, the crews were able to determine their positions with reasonable accuracy.

An objective of the survey was the complete examination, using 50-foot transects, of the designated area. This was not always possible, however. Naturally those areas for which permission was denied were not surveyed. In addition, it was decided to avoid those sites with numbers previously designated by the Laboratory of Anthropology of the Museum of New Mexico because they have already been surveyed. Also, heavily populated areas were avoided since the modern disturbance was so great as to make it unlikely that anything would be found. Finally, part of the right-of-way for Interstate 40 through the canyon was also eliminated from the survey area since it had been surveyed by David H. Snow for the Laboratory of Anthropology in 1972. With these exceptions, the area was totally surveyed.

The procedure used when an archeological site was located was the same for all crews. The entire crew assembled. A number, developed for this survey, was assigned to the site. This was not a number designated by the Laboratory of Anthropology, but a field number used to identify the collections from the site during analysis. The extent of the site, that is, the area containing the cultural material, was determined. Using a Brunton compass, the site was mapped, and artifact concentrations, major vegetation, geological and archeological features, water, and modern reference points were located on a single map. The field portion of the site survey form was completed, and the site's location was marked on the USGS topographic map. Surface collection, except for large ground stone, was made. These collections, stored by site number, were deposited daily in the field school laboratory (Blevins 1975:71-72).

The procedure for recording the discovery of an isolated artifact was considerably less complex. Usually, the artifact was held temporarily by the finder until the group was reassembled and the appropriate form could be completed and the map notation made.

Each Friday afternoon during the field seasons, the survey crews met in the field school laboratory to analyze the material which had been collected during that week. This arrangement allowed consultation and encouraged uniformity of classification of the faunal, ceramic, and lithic material from the sites.

For the faunal material, there is little to be said since not much of it was recovered. This is perhaps not surprising considering the age of the sites and the perishability of bone.

The lithic analysis consisted primarily of placing the artifacts into one or another of various descriptive categories, which agree with commonly accepted tool types. A more detailed study of wear patterns has been performed on part of this material (South, et al., 1974).

During the 1974 field season, the field school ceramic categories were judged inadequate for accurate dating of survey material, so a new list of types was generated statistically. These were then correlated to traditional ceramic types, whose time spans were known. Thus, the temporal range of each site in Tijeras Canyon could be placed in the period between the earliest date of the earliest of ceramic category and the latest date of the latest (Blevins, et al., 1975). These categories were also applied to the analysis of the ceramics composing isolated artifacts.

On the basis of these analyses, the field supervisor prepared detailed weekly reports. These, along with locations and descriptions of the sites, are on file at the Department of Anthropology, University of New Mexico.

#### V. Survey Results

A total of 140 prehistoric sites were located by the UNM survey. The earliest dated to 900 A. D., on the basis of ceramics, (TCS-035), and areas associated with the latest are still presently inhabited (TCS-133). Consequently, an occupational history spanning 1,000 years is indicated for Tijeras Canyon.

Sites were temporarily ordered with the aid of traditional southwestern ceramics typologies. Tests of independence, specifically chi-square, were performed regarding the frequency with which any two types co-occurred at a single site. A significance level

of 0.05 was imposed, and a body of systematic relationships exhibiting statistical dependence produced (Nie, et al., 1975:223-224). These relationships were visually portrayed and subdivided along lines of weakness (Kemeny and Snell 1972:25-108) (see chart 1). Four temporally distinct ceramic groups composed of specific ceramic types were generated. A time period for each was derived by combining dates traditionally accepted for its component types (Blevins, et al., 1975). Site ceramic collections were matched to one or more of these groups, and dates determined according to the established time periods. In this manner, a seriation of sites was constructed.

Having developed a temporal scheme by which changes in site morphology and distribution could be monitored, new chi-square tests were run and the same level of significance maintained. These tests examined the co-occurrence of variables recorded during the survey with sites grouped temporally into the time periods just defined. Results indicated strong significant relationships between the established ceramic groups and site locations:

#### Ceramic Group I

1. 95% of sites were at an elevation of 6200 to 6600 feet above sea level. The remaining 5% were above 6600 feet.
2. 60% of sites were situated along the canyon bottom.
3. 60% of sites were exposed to the north.
4. 65% of sites displayed a large number (greater than 50) of modified flakes.
5. 65% of sites displayed a small number (less than 25) of modified flakes.

#### Ceramic Group II

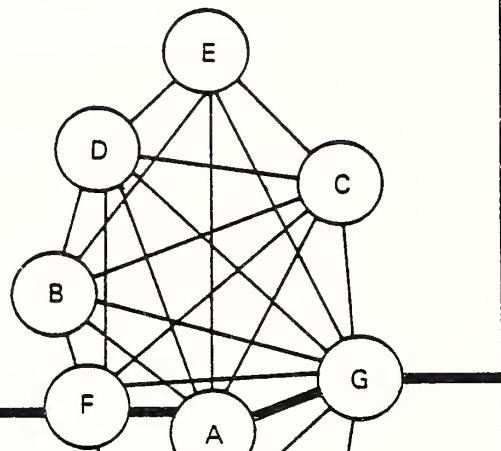
1. 75% of sites were at an elevation of 6200 to 6600 feet above sea level. 5% were below 6200, and 20% were above 6600.
2. 60% of sites were exposed in a southern or eastern direction.
3. 65% of sites displayed a small number (less than 25) of unmodified flakes.
4. 65% of sites displayed a small number (less than 25) of modified flakes.



## ORGANIZATION OF SIGNIFICANTLY RELATED CERAMIC TYPES AND THEIR SUBDIVISION INTO FOUR MAJOR GROUPS

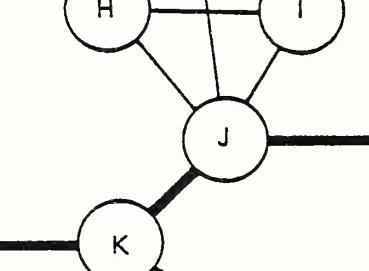
### CERAMIC GROUP I: 900-1300 A.D.

- Node A- Corona Rubbed-Ribbed Ware  
Corona Rubbed-Indented Ware  
Pitche Rubbed-Ribbed Ware  
Tesuque Smeared-Indented Ware
- Node B- Los Lunas Smudged
- Node C- Lincoln Black-on-Red Ware  
Wingate Black-on-Red Ware  
St. John's Polychrome
- Node D- Jornada Brown Ware  
Lino Gray
- Node E- Kana'a Gray  
Kana'a Black-on-white  
San Marcial Black-on-White  
Red Mesa Black-on-White
- Node F- Socorro Black-on-White  
Chupadero Black-on-White  
Tularosa Black-on-White  
Kwahe'e Black-on-White
- Node G- Santa Fe Black-on-White  
Wiyo Black-on-White  
Pindi Black-on-White  
Poge Black-on-White



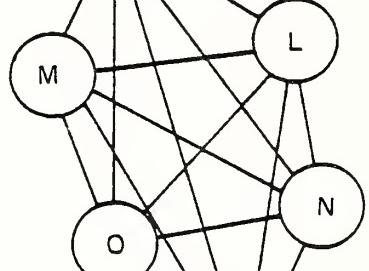
### CERAMIC GROUP II: 1300-1400 A.D.

- Node F- Socorro Black-on-White  
Chupadero Black-on-White  
Tularosa Black-on-White  
Kwahe'e Black-on-White
- Node G- Santa Fe Black-on-White  
Wiyo Black-on-White  
Pindi Black-on-White  
Poge Black-on-White
- Node H- Galisteo Black-on-White  
Heshotauthlia Polychrome
- Node I- Arenal Glaze-Polychrome  
Los Padillas Glaze-Polychrome  
San Clemente Glaze-Polychrome  
Sanchez Glaze-Polychrome
- Node J- Agua Fria Glaze-on-Red  
Sanchez Glaze-on-Red
- Node K- Cienguilla Glaze-on-Yellow  
Cienguilla Glaze-Polychrome  
Sanchez Glaze-on-Yellow



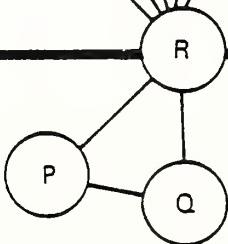
### CERAMIC GROUP III: 1400-1600 A.D.

- Node J- Agua Fria Glaze-on-Red  
Sanchez Glaze-on-Red
- Node K- Cienguilla Glaze-on-Yellow  
Cienguilla Glaze-Polychrome  
Sanchez Glaze-on-Yellow  
Largo Glaze-on-Yellow  
Largo Glaze-on-Red  
Largo Glaze-Polychrome
- Node L- Espinosa Glaze-polychrome
- Node M- San Lazaro Glaze-Polychrome
- Node N- Puaray Glaze-Polychrome  
Pecos Glaze-Polychrome  
Trenaquel Glaze-Polychrome  
Tiguez Glaze-Polychrome
- Node O- Kotyiti Glaze-Polychrome  
Kotyiti Glaze-on-Red  
Cicuye Glaze-Polychrome  
Cicuye Glaze-on-Red  
San Marcos Glaze-Polychrome  
San Marcos Glaze-on-Red
- Node R- Cundiylo Micaceous Smeared-Indented Ware  
Cordova Micaceous-Ribbed Ware



### CERAMIC GROUP IV: 1600-1800 A.D.

- Node R- Cundiylo Micaceous Smeared-Indented Ware  
Cordova Micaceous-Ribbed Ware
- Node P- Zuni Matte Polychromes  
Sikyatki Polychrome  
Sankawi Black-on-Cream  
Tewa Polychromes  
Puname Polychromes
- Node Q- Kapo Ware





### Ceramic Group III

1. 60% of sites were at an elevation greater than 6600 feet above sea level. The remaining 40% were located between 6200 and 6600 feet.
2. 95% of sites were situated in foothill areas.

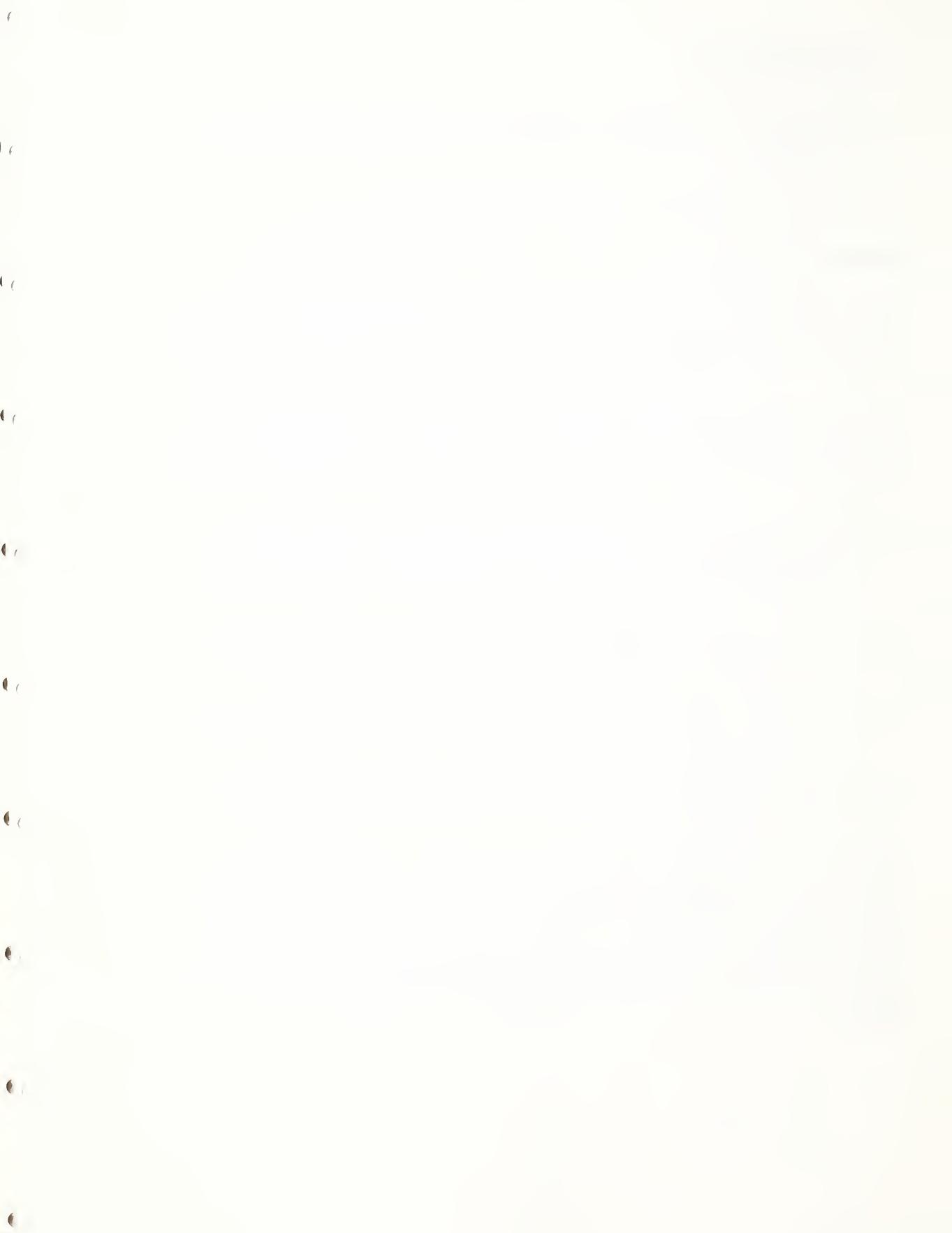
### Ceramic Group IV

45% of sites were at an elevation of less than 6200 feet above sea level. 10% were located between 6200 and 6600 feet, and 45% were located above 6600 feet.

A final series of chi-square tests were carried out with regard to co-occurring survey variables at single sites. A in 0.05 was the level of significance. Results tended to reinforce those previously established:

1. 52.2% of sites located in the canyon bottom were exposed to the north. 63.8% of sites located in foothill areas were exposed to the south or east. The elevation delimiting this transition is 6400 feet above sea level.
2. As site size increased, so did its chances of being exposed to the north or east.
3. As site association with the canyon bottom increased, so did the proliferation of modified flakes.
4. 95% of all sites not exhibiting evidence of structures were located in foothill areas.

Survey variables not subjected to chi-square testing also displayed variation through time. These included site number (maximum at any given point in time), site type (as defined by the survey), site area (maximum at any given point in time), and site relationship to both vegetation densities and perennial water. Temporal fluctuations of each are expressed in graph form on charts 2, 3, 4, and 5.



S  
I  
T  
E  
N  
U  
M  
B  
E  
R

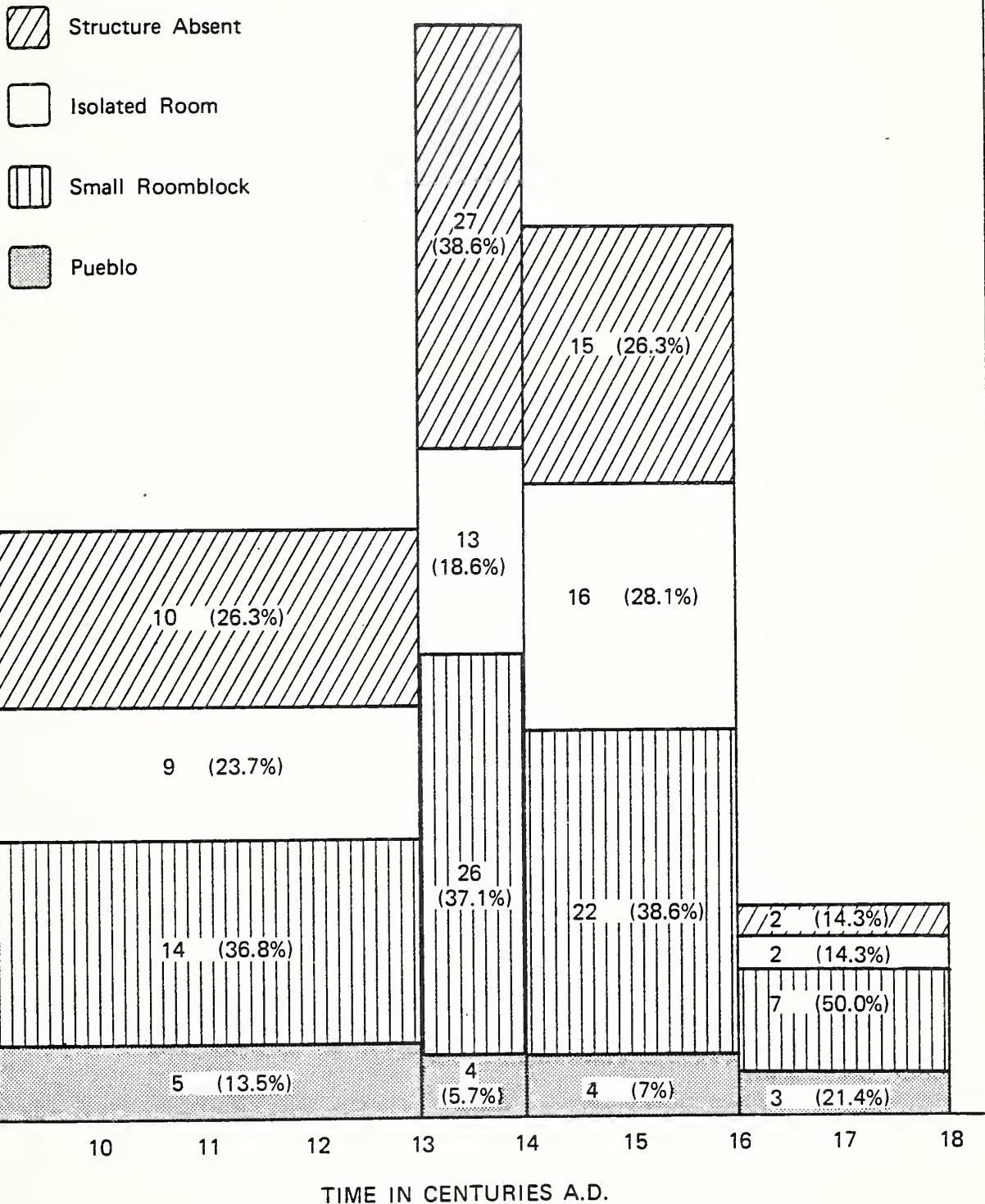
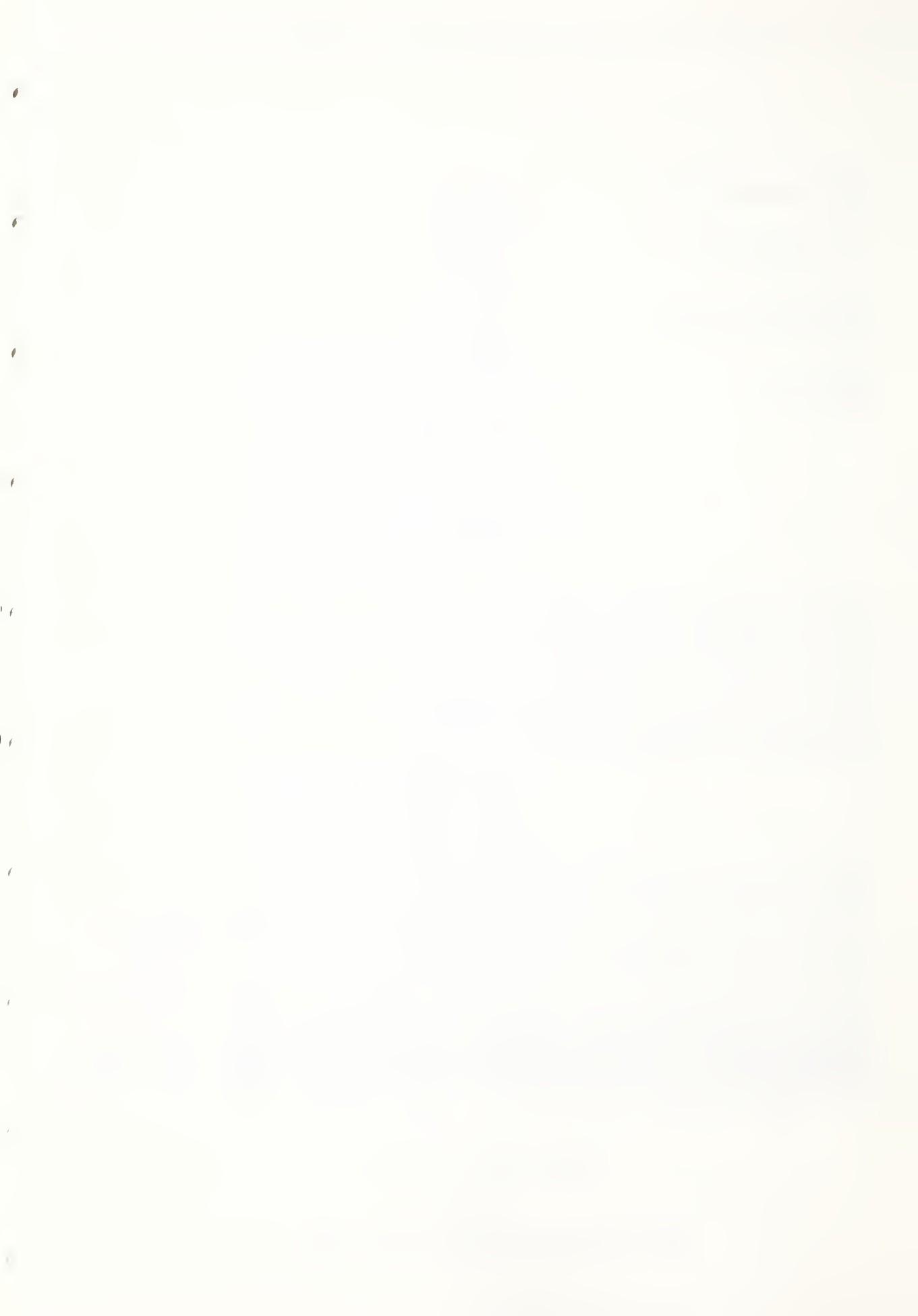


CHART 2  
SITE TYPE AND NUMBER VERSUS TIME



S  
I  
T  
E  
  
 A  
R  
E  
A  
  
 I  
N

Square Meters

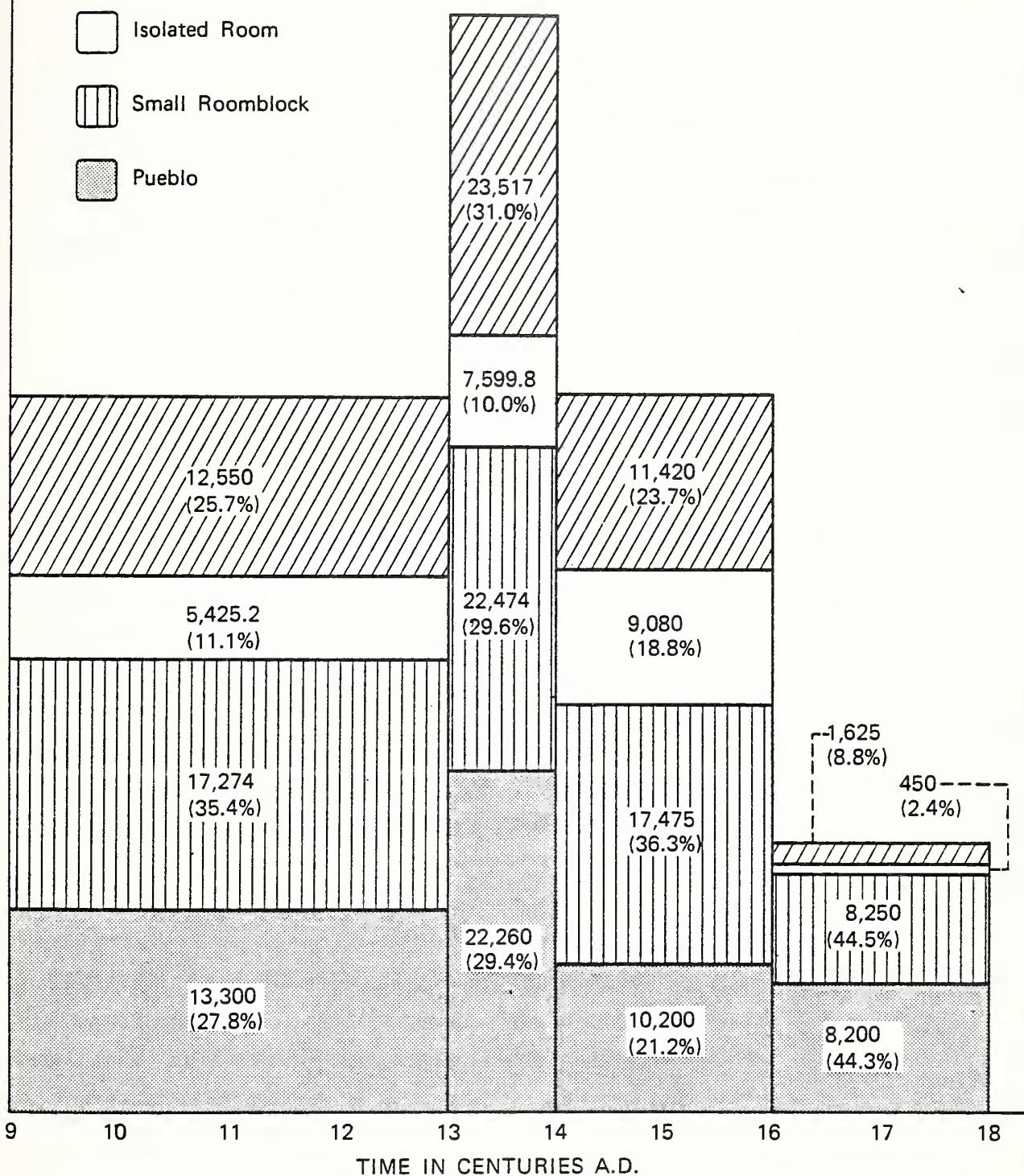


CHART 3  
SITE TYPE AND AREA VERSUS TIME

! f  
! f.  
! f.  
! f.  
f  
f  
f  
(  
f

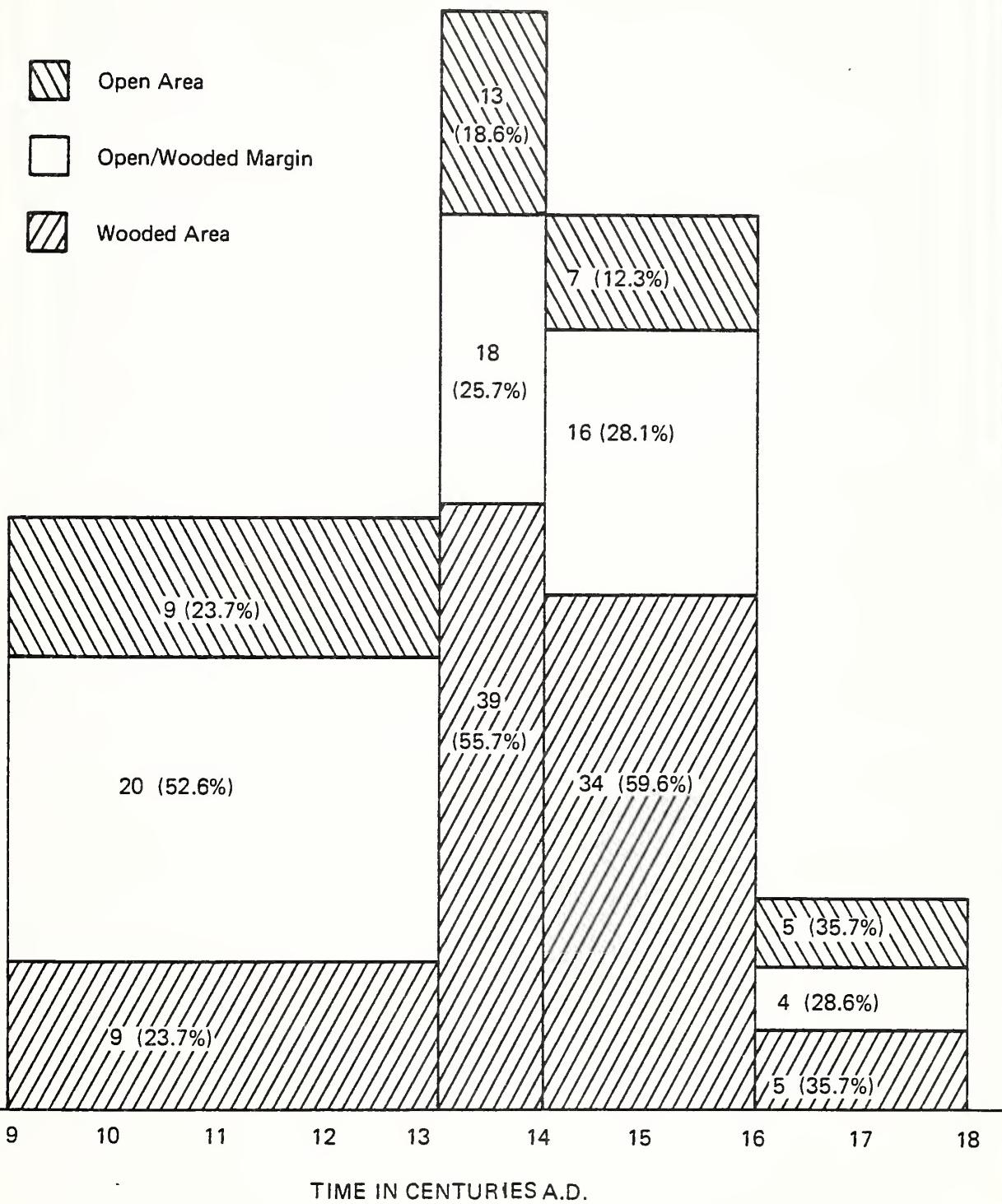


CHART 4  
SITE NUMBER THROUGH TIME VERSUS VEGETATION DENSITY



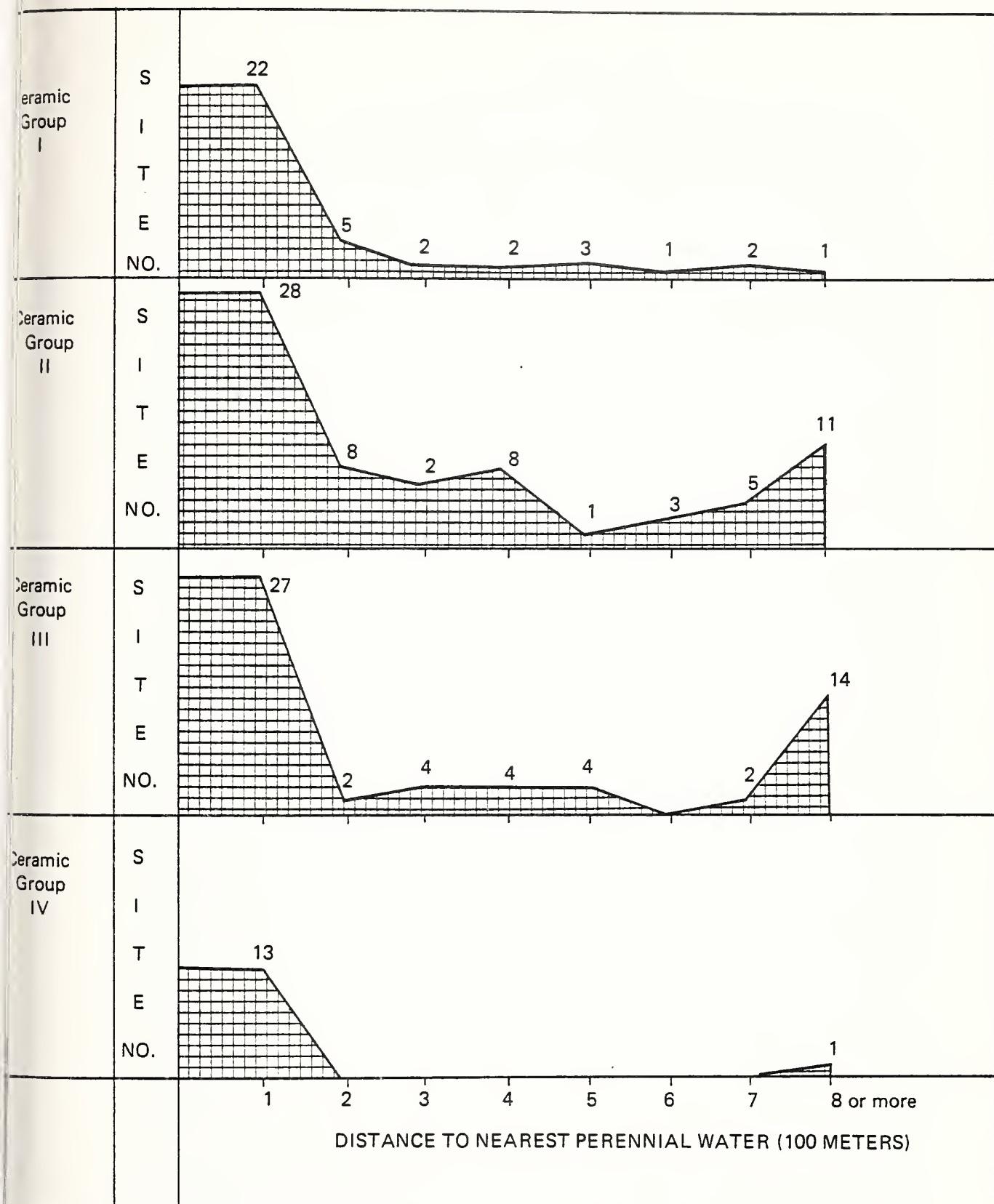
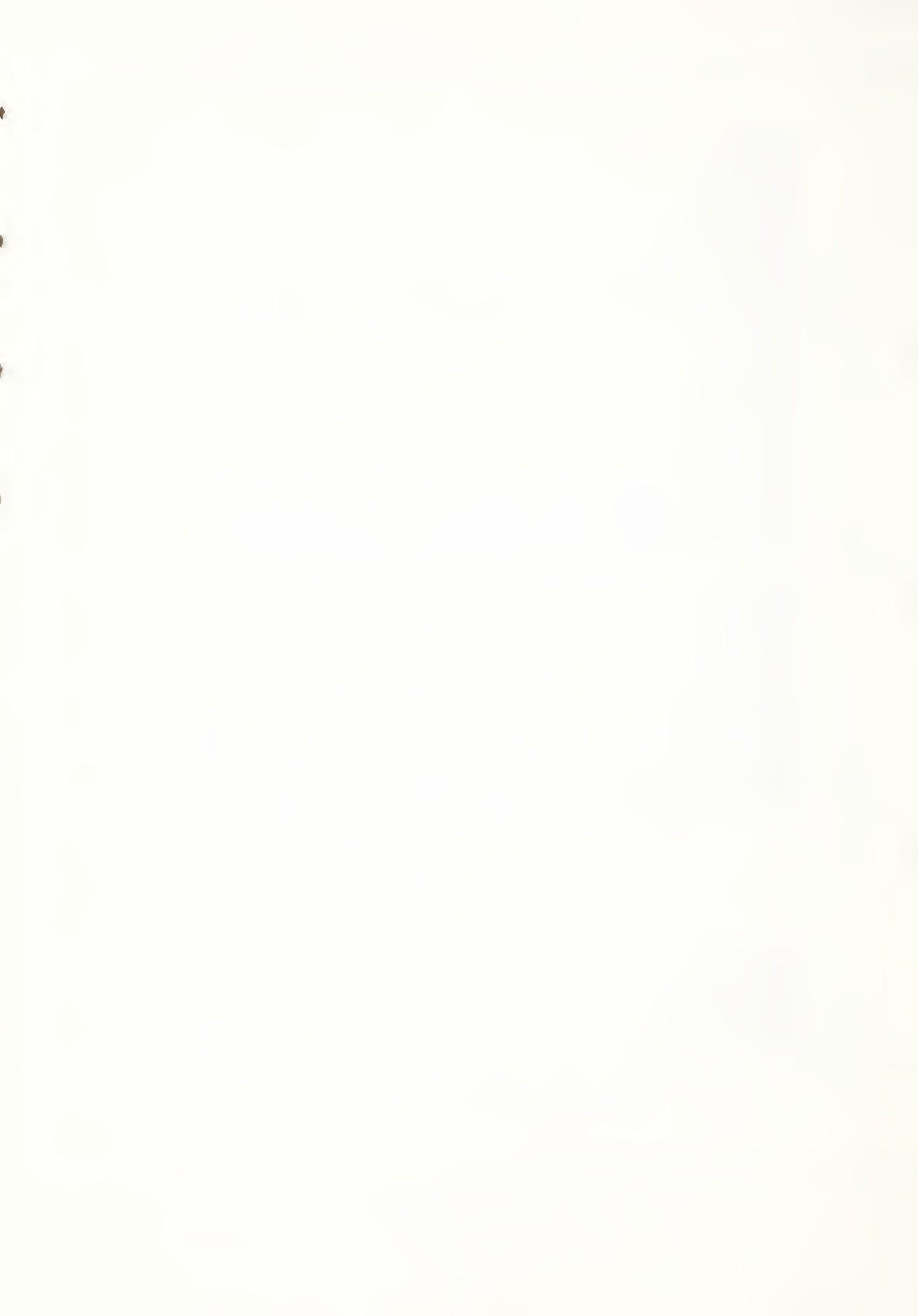


CHART 5  
DISTANCE OF SITES FROM PERENNIAL WATER



## VI. Conclusions

Results of the UNM survey indicate that man's initial utilization of Tijeras Canyon began in about A.D. 900, reflected by those sites associated with Ceramic Group I. The survey did not substantiate previous reports of PaleoIndian or Archaic use of the canyon (cf. Snow 1972).

The locations of the sites associated with Ceramic Group I suggest a subsistence strategy maximizing available resources. Nearly all sites are found in optimal zones of species variation (6200 to 6600 feet above sea level), and most occur in direct association with vegetation changes (open-wooded margins) (chart 4). The mobile nature of this strategy is indicated by an absence of large sites and trash deposits. This would mean a constant relocation of population as resources became available. As a consequence, one would expect water sources in the immediate vicinity of each site. Prehistoric site locations for Ceramic Group I exhibit this characteristic (chart 5). The absence of large sites raises another important question. Did people exploiting the area occupy it on a continual basis? Survey results tend to negate the possibility. Regardless of how clustered sites may be (TCS-011 through TCS-024), their actual number, extent of cultural material, and physical size do not support a 300-year period of annual reoccupation (TCS-016 is a possible exception). Furthermore, localities of presumed habitation have since been established by excavation as areas of limited activity (TCS-129, TCS-132, and TCS-134). The only definite habitation site is located  $1\frac{1}{2}$  miles west of the survey area (excavated in 1975 by the Museum of New Mexico). As a result of its position, its occupants had easy access to both Tijeras Canyon and the Rio Grande Valley. Based on this location, as well as noted attributes for survey sites, a widely distributed seasonal exploitation is proposed. Sites identified by the UNM survey represent portions of a much more extensive annual subsistence round. This suggestion does not detract from the mobile strategy just discussed, but does restrict it to specific periods of the year.

A dramatic change in population and subsistence is indicated by sites associated with Ceramic Group II. Inhabited from A.D. 1300 to 1400, the number of these sites and their total size nearly doubles in only one-third the time compared with those sites documented for the previous period (see charts 2 and 3). An increase of this magnitude implies the influx of an outside population rather than in situ growth. Populations previously exploiting the area on

a seasonal basis would be a likely source of migrants. The most pronounced change in this period is the appearance of clearly year-round habitation sites.

Included is one large aggregate of 10 (Tijeras Pueblo grouping, TCS-053 through TCS-065, excluding TCS-057), and another single site to the north (San Antonio, TCS-133). Between them, they represent 30 percent of the total site area for Ceramic Group II. Remaining localities suggest a subsistence strategy reorganization. Not only have most Group I sites been abandoned (appendix II), but those for Group II are distantly located from water (chart 5). This tends to indicate a central population commuting to surrounding areas of limited activity. Exploitation is still centered on the optimal zone of species variation (6200 to 6600 feet above sea level), but the effects of supporting a large group of people are apparent. The number of sites located outside this zone has grown, and areas of limited activity are now concentrated heavily in wooded regions (chart 4).

Sites corresponding to Ceramic Group III reflect the gradual prehistoric desertion of Tijeras Canyon. At the very beginning of this 200-year period (A.D. 1400-1600), the population center for Group II had been abandoned (Tijeras Pueblo, TCS-053). The northern habitation site displayed substantial growth (San Antonio, TCS-133), but never attained a size comparable to Tijeras Pueblo. The proportion of sites associated with different vegetation densities (chart 4), as well as site distance to water (chart 5), remained constant. This points toward a minimal change in subsistence strategy. However, it is during this period that people were pushed to their greatest limits in terms of elevation and spatial distribution. A majority of sites are located at points greater than 6600 feet above sea level (appendix II) and have become significantly associated with foothill areas. Considering these data, resource depletion is suggested as the cause of abandonment.

Ceramic Group IV sites represent the final remnants of prehistoric occupation in the canyon. Sites are situated along routes favorable to Spanish contact (appendix II), but still maintain a close proximity to water (chart 5). The reliance on trade as a major resource is indicated by a sizeable reduction in sites associated with limited activities (charts 2 and 3). Other site types are relatively small and may be localities of brief but periodic habitation. The temporal span for this period is A.D. 1600 to 1800, but most native peoples had probably moved out by 1650.

Descriptions of subsistence strategy for each of the ceramic periods have been based on two variables: water and vegetation density. In the process underlying assumptions have been involved. First, it was assumed that both variables reflect specific, independent resource needs. Water is, of course, a necessity. In the upper sonoran life zone, vegetation is patterned into belts of open and wooded areas. The fact that one is suited to the establishment of agricultural fields, and the other hunting and gathering, implies two distinct exploitations. The second assumption is that water sources and vegetation borders have remained unchanged since prehistoric times. Surface water feeding Tijeras Canyon originates as runoff from the Sandia Mountains. A product of precipitation at higher elevation, it surfaces as springs along the survey area's northern boundary. The mountains serving as catalysts for precipitation tend to insure the permanence of these water sources. Ceramic Group II sites do indicate a possible rainfall increase for that period. A large number of sites are situated adjacent to what are now extinct drainages. Apparently the result of cooler temperatures, locations are also deliberately exposed toward directions maximizing warmth and sunlight (south and east).

Concerning the extents of open and wooded areas, those subjected to modern use have certainly been altered. However, the survey covered a number of remote regions which have remained unaffected. Sites located in these remote areas were consistently discovered in direct association with vegetation borders. This suggests very little change in the extent of vegetation belts.

Conclusions drawn from survey results have been presented in an extremely general form. The absence of excavation data on a regional scale prevents discussion of more specific implications.

The value of Tijeras Canyon regarding prehistoric human behavior is immense. Because of its topography, the availability of resources is restricted and can be determined with certain amounts of reliability. The presence of a human population continually readapting to this limitation creates an ideal situation for testing relationships between subsistence strategy and population dynamics. This potential is further amplified by the degree of site preservation. Although modern utilization is extensive in the area, growth has circumvented many prehistoric locations.

Finally, the completion of this study in no way diminishes the need for further survey. Regions covered in 1974 and 1975 included only half of what is traditionally considered Tijeras Canyon. Any future

investigation should center on remaining areas, and possibly follow Tijeras wash to its confluence with the Rio Grande. Prehistoric patterns of site distribution cannot be completely evaluated until this macroscopic view is complete.

## VII. References

- Bailey, V.
- 1913 Life Zones and Crop Zones of New Mexico, North American Fauna, No. 35, U. S. Department of Agriculture, Washington, D. C.
- Blevins, B. B.
- 1974 Tijeras Canyon Archeological Survey States Reports.
- 1975 Unpublished ms. on file, Department of Anthropology, University of New Mexico, Albuquerque.
- 1975 The Archeological Survey of Tijeras Canyon, In L.S. Cordell, The 1974 Excavation of Tijeras Pueblo, Cibola National Forest, New Mexico. Archeological Report #5, USDA Forest Service, Southwestern Region, Albuquerque, pp. 69-82.
- Blevins, B., L. Davis, and S. Hoagland
- 1975 The Establishment of a Ceramic Typology for Tijeras Canyon, New Mexico. Unpublished ms. on file, Department of Anthropology, University of New Mexico, Albuquerque.
- Cordell, L. S.
- 1975 The 1974 Excavation of Tijeras Pueblo, Cibola National Forest, New Mexico. Archeological Report #5, USDA Forest Service, Southwestern Region, Albuquerque.
- Joiner, C.
- 1975 Section Reports from the Tijeras Canyon Survey. Unpublished reports on file, Department of Anthropology, University of New Mexico, Albuquerque.
- Judge, W. J.
- 1974 The Excavation of Tijeras Pueblo 1971-1973: Preliminary Report; Archeological Report #3, USDA Forest Service, Southwestern Region, Albuquerque.
- Kelley, V. C.
- 1963 Geological Map of the Sandia Mountains and Vicinity, New Mexico, Geological Map #18, USGS and UNM.

- Kelley, V. C.
- 1969 Albuquerque, its Mountains, Valley, Water, and Volcanoes. Scenic Trips to the Geological Past, No. 9. State Bureau of Mines and Mineral Resources, New Mexico, Institute of Mining and Technology, Socorro, New Mexico.
- Kemeny, J. G. and J. L. Snell
- 1972 Mathematical Models in the Social Sciences, M.I.T. Press, Cambridge and London.
- Laboratory of Anthropology
- 1976 Laboratory of Anthropology unpublished files as of 1976, Museum of New Mexico, Santa Fe.
- Loose, R. W.
- 1974 Geology at Tijeras Pueblo, In W. J. Judge, The Excavation of Tijeras Pueblo, 1971-1973: Preliminary Report, Archeological Report #3, USDA Forest Service, Southwestern Region, Albuquerque.
- Middle Rio Grande Council of Governments, The
- 1974 Soil Data Handbook and Maps, Decision Making Guide for Land Use Planning #1, Albuquerque.
- Nie, N. H., et al.
- 1975 Statistical Package for the Social Sciences, McGraw-Hill Book Company, N.Y.
- Robinson, W. J., et al.
- 1972 Tree-Ring Dates from New Mexico I, O, U, Laboratory of Tree-Ring Research, University of Arizona, Tucson.
- Smylie, T. M.
- n.d. A Guide to the Mammals of The Sandia Mountains, Cibola National Forest, Sandia Ranger District, USDA Forest Service, Southwestern Region.
- Snow, D. H.
- 1972 Archeological Survey, New Mexico State Highway Project, Tijeras Canyon, I-40-3(18)169. The Museum of New Mexico, Santa Fe, Unpublished ms.

South, D., R. Lurch, B. Blevins, and R. Richardson  
1974 Wear Pattern Analysis of Silicaceous Lithics: Structure  
and Motives. Unpublished ms. on file, Department of  
Anthropology, University of New Mexico, Albuquerque.

Ungnade, Herbert E.  
1972 Guide to the New Mexico Mountains. University of  
New Mexico Press, Albuquerque.

U. S. Department of Commerce  
1965 Climatography of the United States, No. 86-25,  
Climatic Summary of the United States - New Mexico,  
Government Printing Office, Washington.



VIII. Appendices

APPENDIX I

Individual Site Locations



<u>Site #</u>	<u>Ceramic Group</u>	<u>Corresponding Date</u>	<u>Structure</u>
001	I, IV	900-1300, 1600-1800	Small roomblock
002	II	1300-1400	None
003	II	1300-1400	None
004	II	1300-1400	None
005	II	1300-1400	None
006	III, IV	1400-1800	None
007	II	1300-1400	Small roomblock
008	II	1300-1400	None
009	II	1300-1400	None
010	II	1300-1400	None
011	I, II	900-1400	Small roomblock
012	I, III, IV	900-1300, 1400-1800	Pueblo
013	I	900-1300	None
014	I, II	900-1400	Small roomblock
015	I	900-1300	Small roomblock
016	I	900-1300	Pueblo
017	I	900-1300	Small roomblock
018	I	900-1300	Small roomblock
019	I	900-1300	None
020	I	900-1300	Small roomblock
021	I	900-1300	Isolated room
022	I	900-1300	Isolated room
023	I, II	900-1400	Small roomblock
024	I	900-1300	Small roomblock
025	II	1300-1400	Isolated room
026	II, III	1300-1600	Small roomblock
027	II	1300-1400	Isolated room
028	II	1300-1400	None
029	II	1300-1400	None
030	III	1400-1600	Small roomblock
031	III	1400-1600	Small roomblock
032	II	1300-1400	Isolated room
033	II	1300-1400	None
034	II	1300-1400	None
035	I	900-1300	None
036	II	1300-1400	None
037	III	1400-1600	None
038	II	1300-1400	None
039	I	900-1300	Small roomblock
040	II	1300-1400	Isolated room
041	II	1300-1400	None
042	I, II	900-1400	Small roomblock

<u>Site #</u>	<u>Ceramic Group</u>	<u>Corresponding Date</u>	<u>Structure</u>
043	I	900-1300	Isolated room
044	III	1400-1600	Pueblo
045	III	1400-1600	Small roomblock
046	II	1300-1400	Small roomblock
047	I, III	900-1300, 1400-1600	None
048	I, II	900-1300	Isolated room
049	II	1300-1400	Small roomblock
050	III	1400-1600	Isolated room

<u>Site Area in Square Meters</u>	<u>Distance to Perennial Water (in Meters)</u>	<u>Site Relationship to Vegetation Densities</u>
2275	100	Open area
1650	600	Wooded area
3025	700	Wooded area
1925	900	Wooded area
300	1100	Wooded area
1400	1000	Wooded area
1600	2000	Open/wooded margin
100	1500	Open/wooded margin
1000	700	Wooded area
300	1400	Wooded area
1500	200	Open/wooded margin
1600	100	Open area
1200	300	Open/wooded margin
1600	100	Open area
2000	100	Open/wooded margin
1500	100	Open/wooded margin
750	100	Open/wooded margin
375	100	Open/wooded margin
400	100	Open/wooded margin
600	100	Open/wooded margin
400	100	Open/wooded margin
900	100	Open area
2250	200	Wooded area
1200	200	Wooded area
225	400	Open/wooded margin
1225	400	Wooded area
1200	400	Wooded area
225	400	Open/wooded margin
225	400	Wooded area
900	100	Wooded area
700	100	Wooded area
1000	100	Wooded area
225	400	Wooded area
400	300	Wooded area
3600	300	Wooded area
375	900	Wooded area
225	1000	Wooded area
600	800	Wooded area
1950	700	Wooded area
400	700	Open area
400	400	Wooded area

<u>Site Area in Square Meters</u>	<u>Distance to Perennial Water (in Meters)</u>	<u>Site Relationship to Vegetation Densities</u>
1500	500	Wooded area
900	500	Wooded area
2000	400	Wooded area
2500	200	Wooded area
625	700	Wooded area
1350	400	Open/wooded margin
100	600	Open/wooded margin
1000	1500	Open area
600	500	Wooded area

<u>Site #</u>	<u>Ceramic Group</u>	<u>Corresponding Date</u>	<u>Structure</u>
051	III	1400-1600	Isolated room
052	III	1400-1600	Isolated room
053	II	1300-1400	Pueblo
054			
055	II	1300-1400	Pueblo
056			
057	III	1400-1600	Isolated room
058	I, II	900-1400	Isolated room
059	II	1300-1400	Small roomblock
060	II	1300-1400	Small roomblock
061	I, II	900-1400	Small roomblock
062	II	1300-1400	Small roomblock
063	II	1300-1400	Small roomblock
064	II	1300-1400	None
065	II	1300-1400	Pueblo
066	I, II	900-1400	Isolated room
067	II, III	1300-1600	Small roomblock
068	III	1400-1600	None
069	III	1400-1600	None
070	III	1400-1600	None
071	III	1400-1600	Isolated room
072	III	1400-1600	Isolated room
073	I, II, III	900-1600	Small roomblock
074	II, III	1300-1600	Small roomblock
075	I	900-1300	Isolated room
076	III	1400-1600	Small roomblock
077	III	1400-1600	Isolated room
078	III	1400-1600	Small roomblock
079	III	1400-1600	Small roomblock
080	III	1400-1600	Isolated room
081	III	1400-1600	Small roomblock
082	II, III	1300-1600	Small roomblock
083	II	1300-1400	Small roomblock
084	II	1300-1400	Small roomblock
085	II	1300-1400	Small roomblock
086	III	1400-1600	Small roomblock
087	II, III, IV	1300-1800	Small roomblock
088	II	1300-1400	Isolated room
089	III	1400-1600	Small roomblock
090	II	1300-1400	Small roomblock
091	II	1300-1400	Isolated room
092	III, IV	1400-1800	Small roomblock

<u>Site #</u>	<u>Ceramic Group</u>	<u>Corresponding Date</u>	<u>Structure</u>
093	III	1400-1600	Isolated room
094	II	1300-1400	Small roomblock
095	IV	1600-1800	Isolated room
096	III	1400-1600	Isolated room
097	II, IV	1300-1400, 1600-1800	None
098	III	1400-1600	Small roomblock
099	III, IV	1400-1800	Isolated room
100	I	900-1300	None

<u>Site Area in Square Meters</u>	<u>Distance to Perennial Water (in Meters)</u>	<u>Site Relationship to Vegetation Densities</u>
300	500	Wooded area
900	100	Open/wooded margin
10960	100	Open area
3800	100	Open/wooded margin
200	100	Open area
900	100	Open area
1000	100	Open area
400	100	Open area
700	100	Open area
225	100	Open/wooded margin
200	100	Open/wooded margin
1200	100	Open/wooded margin
2500	100	Open/wooded margin
225	200	Open/wooded margin
900	800	Open/wooded margin
225	1500	Wooded area
150	1400	Open/wooded margin
225	1300	Open/wooded margin
225	1200	Wooded area
300	800	Open/wooded margin
375	800	Open/wooded margin
750	1000	Wooded area
800	700	Open/wooded margin
400	500	Wooded area
1000	800	Wooded area
600	800	Wooded area
100	1100	Open/wooded margin
25	1400	Open/wooded margin
400	100	Wooded area
1200	300	Wooded area
225	200	Wooded area
150	200	Wooded area
150	100	Wooded area
400	100	Wooded area
1800	100	Wooded area
100	100	Wooded area
400	100	Open/wooded margin
200	100	Open/wooded margin
150	200	Wooded area
200	100	Wooded area

<u>Site Area in Square Meters</u>	<u>Distance to Perennial Water (in Meters)</u>	<u>Site Relationship to Vegetation Densities</u>
300	100	Wooded area
200	100	Open/wooded margin
300	100	Open/wooded margin
400	300	Wooded area
225	100	Open/wooded margin
700	100	Wooded area
450	100	Wooded area
1100	500	Open/wooded margin

<u>Site #</u>	<u>Ceramic Group</u>	<u>Corresponding Date</u>	<u>Structure</u>
101	II	1300-1400	None
102	II, III	1300-1600	None
103	II, III	1300-1600	Isolated room
104	II, III	1300-1600	None
105	I, III	900-1300, 1400-1600	None
106	III	1400-1600	None
107	II, III	1300-1600	None
108	II, III	1300-1600	None
109	III	1400-1600	None
110	III	1400-1600	Isolated room
111	II	1300-1400	Small roomblock
112	III	1400-1600	Small roomblock
113	III	1400-1600	Small roomblock
114	II	1300-1400	Small roomblock
115	IV	1600-1800	Small roomblock
116	IV	1600-1800	Small roomblock
117	II	1300-1400	Small roomblock
118	III	1400-1600	None
119	III	1400-1600	Small roomblock
120	II	1300-1400	Isolated room
121	III	1400-1600	None
122	III, IV	1400-1800	Small roomblock
123	II	1300-1400	None
124	II	1300-1400	None
125	I, II	900-1400	None
126	I	900-1300	None
127	I, III, IV	900-1300, 1400-1800	Pueblo
128	I, II	900-1400	None
129	I	900-1300	Pueblo
130	I, IV	900-1300, 1600-1800	Small roomblock
131	II	1300-1400	None
132	I	900-1300	None
133	I, II, III, IV	900-1800	Pueblo
134	I	900-1300	Isolated room
135	III	1400-1600	Small roomblock
136	III*	1300-1400	None
137	II, III	1300-1600	Isolated room
138	II, III	1300-1600	Isolated room
139	III	1400-1600	Small roomblock
140	I	900-1300	None

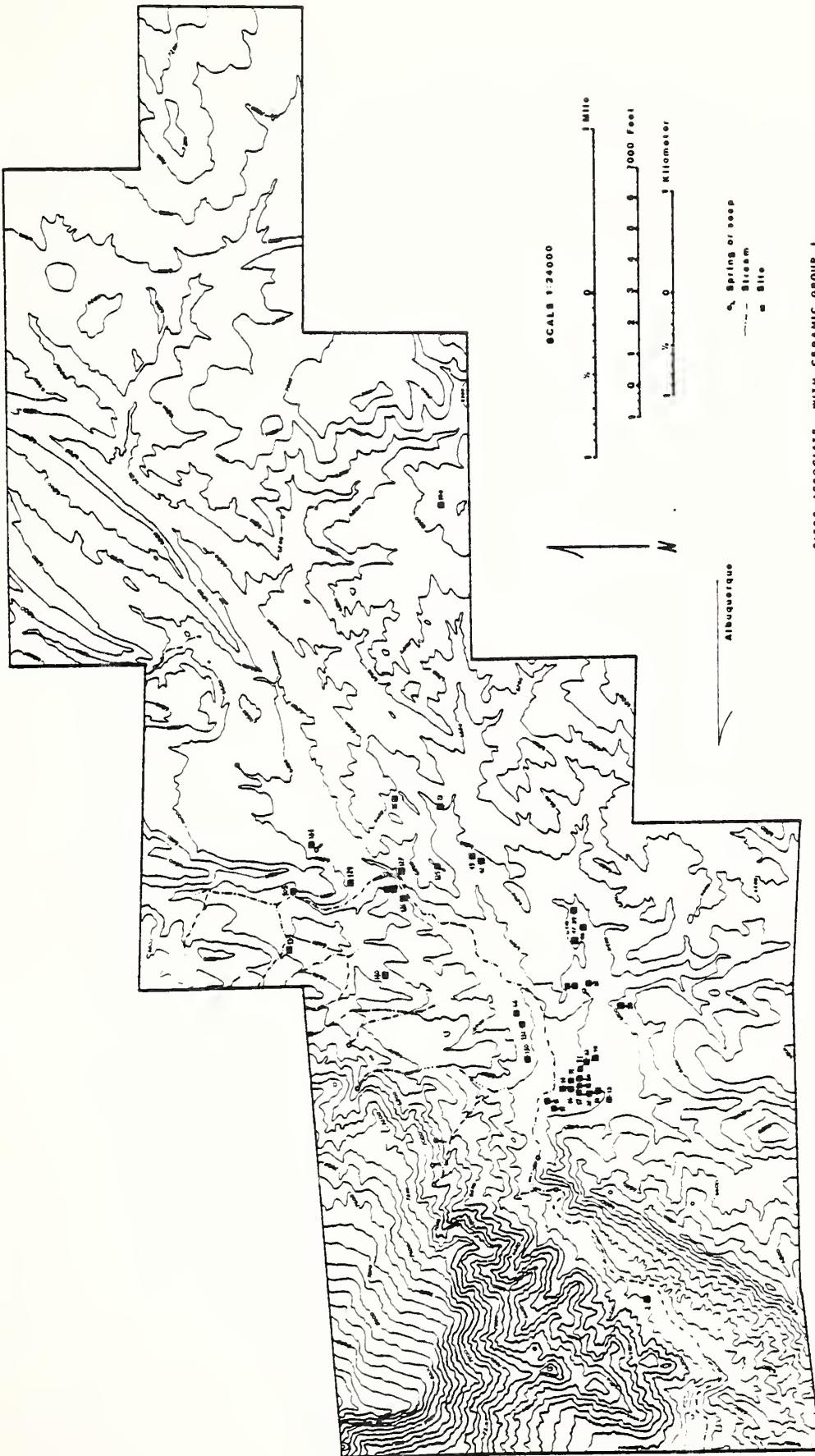
\*This site was originally classified as a member of Ceramic Group II. As a result, computations for that group have included it. It has since been established as a Group III site.

<u>Site Area in Square Meters</u>	<u>Distance to Perennial Water (in Meters)</u>	<u>Site Relationship to Vegetation Densities</u>
400	3	Wooded area
375	1	Wooded area
1800	1	Wooded area
875	1	Wooded area
875	1	Open/wooded margin
1800	4	Open area
1750	1	Wooded area
1200	3	Wooded area
150	2	Open/wooded margin
1050	1	Wooded area
1250	1	Open/wooded margin
300	5	Wooded area
1000	1	Open/wooded margin
1200	1	Open area
750	1	Open area
1500	1	Open/wooded margin
250	7	Wooded area
20	7	Wooded area
800	7	Open/wooded margin
300	6	Open area
800	3	Open/wooded margin
1600	1	Open area
1600	2	Open area
300	3	Wooded area
3000	4	Wooded area
300	1	Open area
1600	1	Open area
100	1	Wooded area
1800	1	Open/wooded margin
200	1	Open/wooded margin
----	3	Feature (Burials)
600	1	Open/wooded margin
5000	1	Open area
600	1	Open/wooded margin
225	1	Open/wooded margin
----	2	Feature (Pictographs)
600	1	Wooded area
600	1	Wooded area
600	1	Open area
600	2	Wooded area

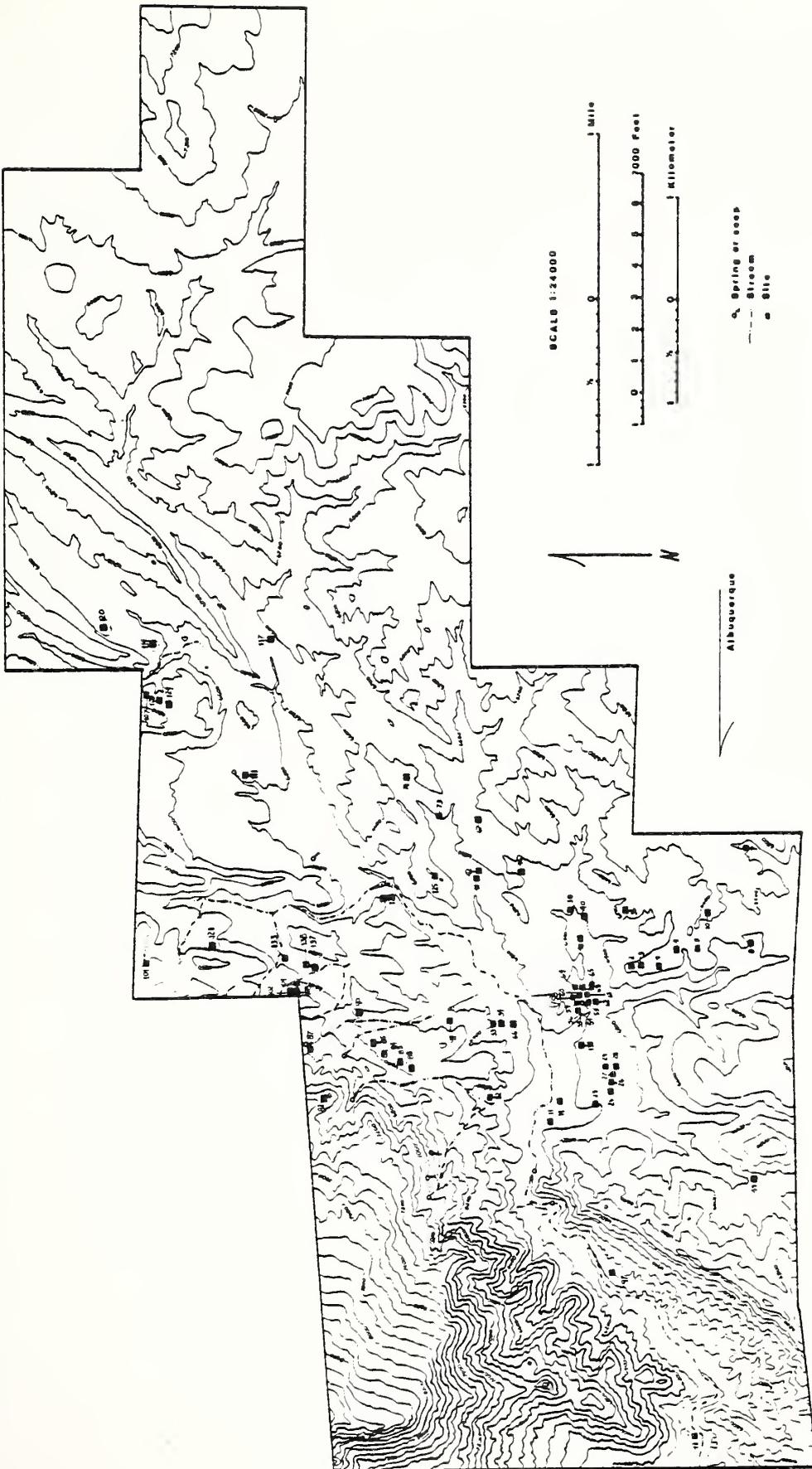
## APPENDIX II

### Site Locations According to Ceramic Groups



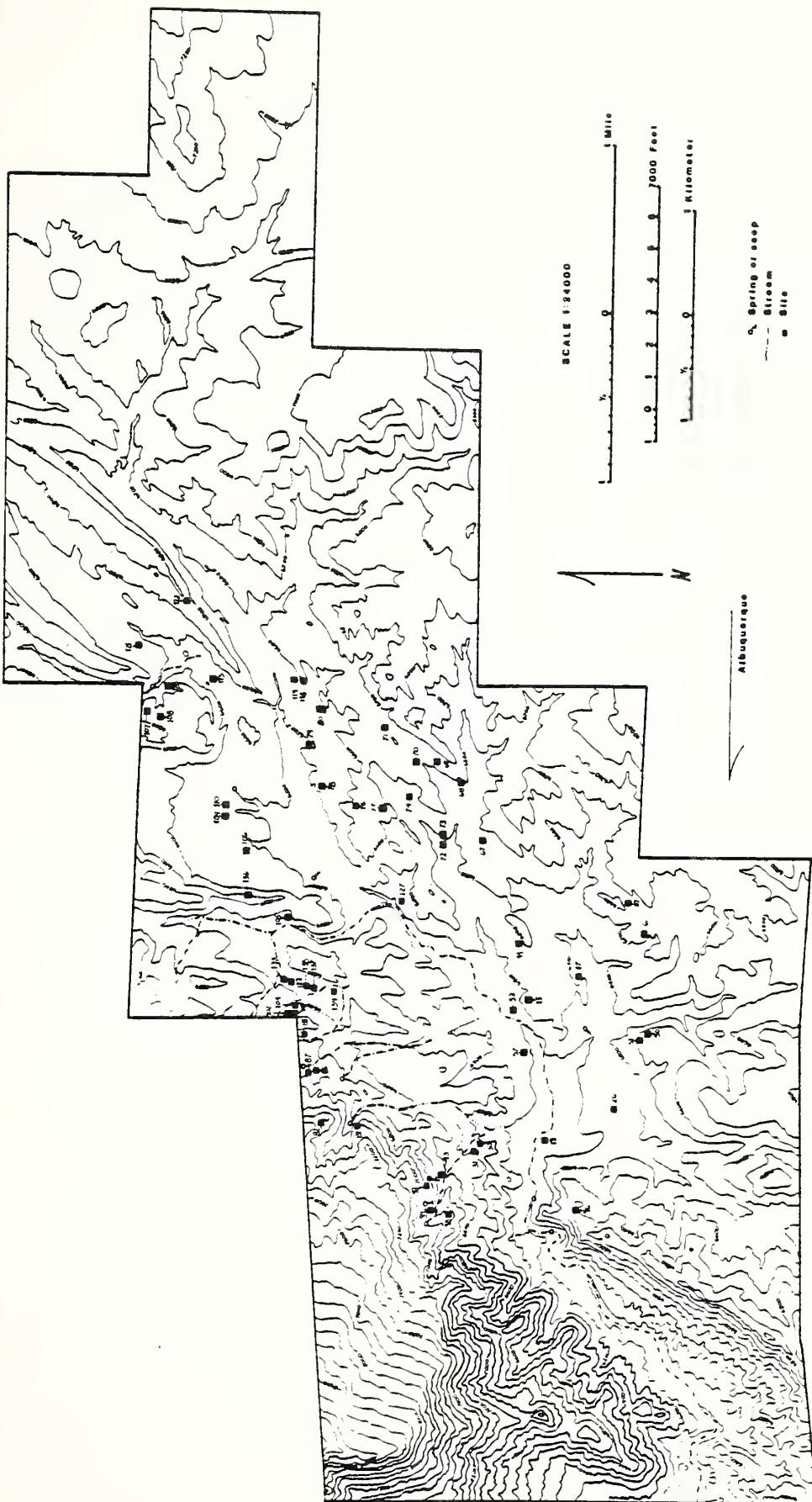




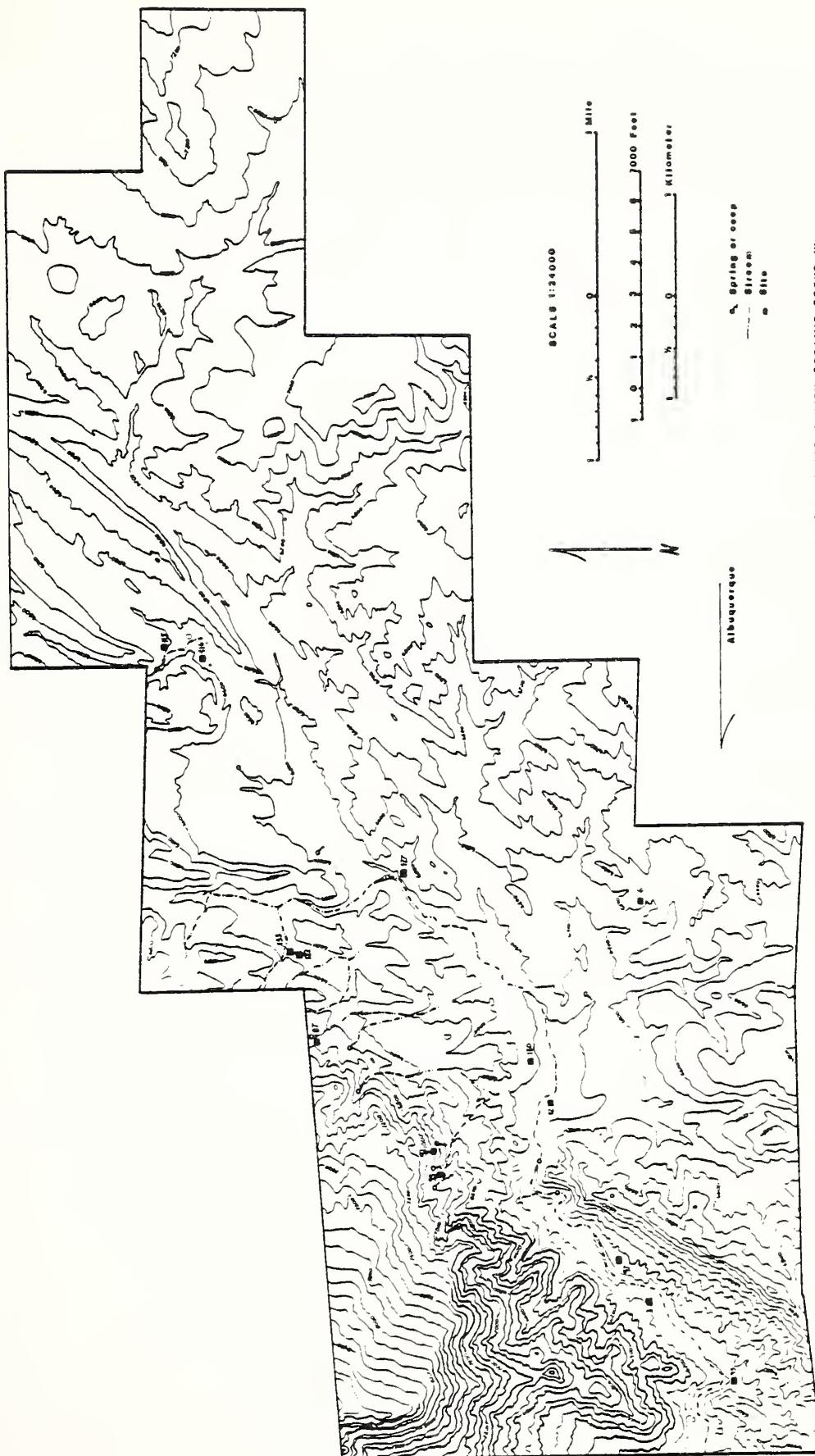


SITES ASSOCIATED WITH CERAMIC GROUP II









SITES ASSOCIATED WITH CERAMIC GROUP IV



THE 1976 EXCAVATION OF TIJERAS PUEBLO

Cibola National Forest, New Mexico:

Final Field Report

By

Dr. Linda S. Cordell

With Contributions By

Stephen L. Fosberg

Charles K. Lumpkin, Jr.

Brona G. Simon

David S. Weaver



### Acknowledgements

The success of an archeological field season, as measured by the amount of work completed and the quality of data recovered, depends upon dedicated cooperation among people through very long work days under less than ideal physical conditions. The students who participated in the 1976 field school consistently demonstrated their dedication by enthusiastically learning and doing fine archeological research. I am grateful for their efforts during the summer, and I hope that many of them will become my professional colleagues in the future. The field school staff--Stephen Fosberg, Chuck Lumpkin, Renee Richardson, Brona Simon and Liz Wuertele--deserve the highest praise. Not only did each of them do a superb job in the field, but each one also shared their expertise by participating in or conducting extra teaching situations for the students.

The preliminary analysis of material recovered during the 1976 season was more detailed than that of previous years. This was made possible by the efforts of Julia Dougherty, Beth O'Leary and Stephen Fosberg who, in addition to their responsibilities as crew members and staff, organized the ceramic, fauna and lithic laboratories, respectively. Dave Weaver's participation in the recovery of human osteological remains contributed greatly to the season's accomplishments. Lynn Jorde, with characteristic modest efficiency, completely reorganized the field school computer recording system. Each of these people deserves my thanks.

Once again, I am greatly appreciative of the unselfish support of members of the U. S. Forest Service. The staff of the Sandia Ranger Station, Cibola National Forest, were consistently helpful. Dean Berkey deserves special credit for his cooperation throughout the summer. Dee Green and Landon Smith, of the Southwestern Regional Office, gave invaluable professional assistance. Dr. Green's considerate help in the preparation of this report has been invaluable. The Tijeras project, I believe, demonstrates the benefits of the close cooperation between the University of New Mexico and the U. S. Forest Service.



Contents

	<u>Page</u>
I. Introduction	173
II. Goals of the 1976 Excavation	174
III. Summary of Field Work: Strategy and Results	175
IV. Revisions in Recording and Analytic Procedures	186
V. Experimental Procedures	191
VI. Tree-Ring Dates and Chronology	192
VII. Burials	193
VIII. Conclusions and Evaluation	193
IX. References	195
X. Appendices	197

Appendix A - Tree-Ring Dates, 1975 and 1976 Seasons

Appendix B - Skeletal Remains from 1976 Excavation  
by David S. Weaver

Appendix C - Teaching Assistant Report 1976 Season  
by Brona G. Simon

Appendix D - Teaching Assistant Report 1976 Season  
by Stephen L. Fosberg

Appendix E - Teaching Assistant Report 1976 Season  
by Charles K. Lumpkin, Jr.



List of Maps

5. L.A. 581 Tijeras Pueblo, Trench C
6. L.A. 581 Tijeras Pueblo, Room 128
7. L.A. 581 Tijeras Pueblo, Room Block VIII
8. L.A. 581 Tijeras Pueblo, Rooms 122, 126, 131, and 132
9. L.A. 581 Tijeras Pueblo, Room 127 and Trench 060S/120E



## I. Introduction

During the summer of 1976, the University of New Mexico Field School in Archeology concluded its sixth season of excavation at Tijeras Pueblo. This report will largely be supplementary to those already appearing in this series (Judge 1974, Cordell 1975, 1977). The focus of the report will be on the goals set for the season's work and accomplishments with respect to these goals. Fortunately, in view of the fact that this was the final summer of excavation, surprises were minor. The report does fill in most of the gaps in our previous statements.

Although our field methods followed those used in previous summers (see Judge 1974:24-31 for details), major changes in laboratory analysis and recording were initiated. These will be discussed in some detail. Our work schedule permitted some experimentation in the field, and a discussion of this is included in this report.

The 1976 field season began on June 7 and ended July 23. Some 35 students from various colleges and universities participated in the program. Stephen L. Fosberg, Charles K. Lumpkin, Jr., and Brona G. Simon served as teaching assistants at the site. R. Renee Richardson was again the teaching assistant responsible for the laboratory at the UNM campus. Elizabeth M. Wuertele did all mapping and photography. David S. Weaver, acting as a liaison between the field crews and the osteology laboratory at UNM, supervised the removal of human skeletal remains. The writer again served as field director.

In addition to our basic work in archeology, the field school also participated in making a documentary film on the work at Tijeras Pueblo. The 15-minute film was produced through a cooperative agreement between the Forest Service and the University of New Mexico. Helen Conover, a graduate student in anthropology at UNM, planned and coordinated the film venture. A copy of the film is available at the visitor's center at the Sandia Ranger Station and should provide the interested public with an introduction to the importance of preserving archeological sites as part of our cultural resources as well as an overview of the knowledge we have obtained about Tijeras Pueblo as a prehistoric community.

## II. Goals of the 1976 Excavation

Research at Tijeras Pueblo has been directed toward exploring the relationship between resource availability and population fluctuations. Our working hypotheses have included the notions that as long as resources (water, food, fuel, and building material) are abundant, population will grow. Diminishing resources might be reflected by the adoption of one or several strategies including population aggregation, labor intensification, elaboration of trade networks and ultimately site abandonment. Each of these alternatives could be ranked with respect to "cost" to the cultural system as well as appropriateness in alleviating the particular kind of stress involved. Specific expectations have been discussed in the report of the 1975 work.

The research focus demands that population dynamics at the site be monitored independently of paleoenvironmental data reflecting resource abundance. Our approach to determining population dynamics at the site has been to delimit the size of Tijeras Pueblo (taking into consideration the size, number and probable function of rooms) at different times during its occupational history. Data appropriate to the questions involving resources have been collected, and analyses will include dendroclimatological, palynological, macrobotanical and faunal studies. The occupational history of Tijeras Pueblo is complex. On the basis of examination of tree-ring dates, stratigraphic profiles and wall abutments, I suggested, in the report of the 1975 season, that the occupation of Tijeras Pueblo could be divided into initial, middle and late building periods. I further suggested that the initial occupation seemed to have been the largest and the longest in duration. The middle period seemed confined to the "planned construction" limited to the main mound and dating from the early 1390's to not later than about 1425. The final period seemed to consist of a very brief occupation or use of the site for only limited activities during the latter half of the 15th century. The probable large size of the initial occupation was discovered only after mechanical removal of overburden and extensive trenching during the 1974 and 1975 seasons indicated the existence of underlying, offset walls beneath rooms dated to the 1390's. These extended below the central plaza area of the main mound and continued at least 50 feet north of the massive north wall of the middle occupation of the main mound. In addition, tree-ring dates and ceramic frequencies from Room Blocks VI and VII (map 1b) indicated that these outlying constructions were probably built during the initial occupation.

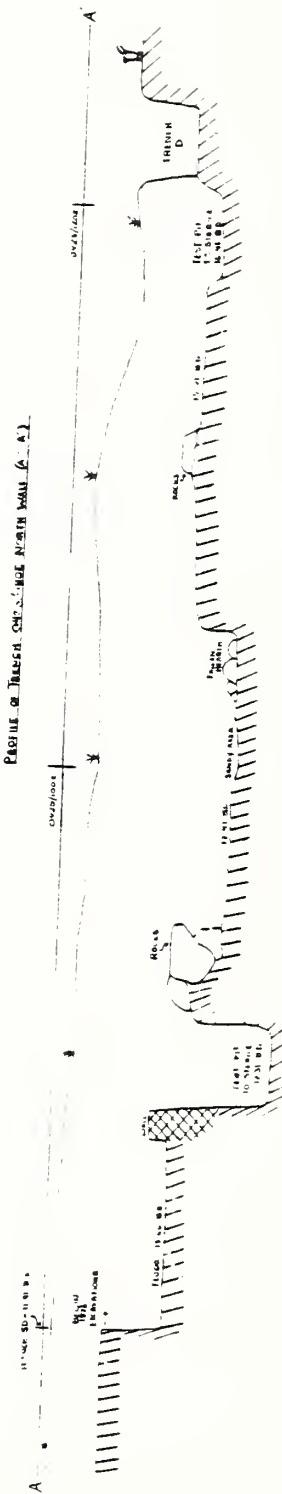
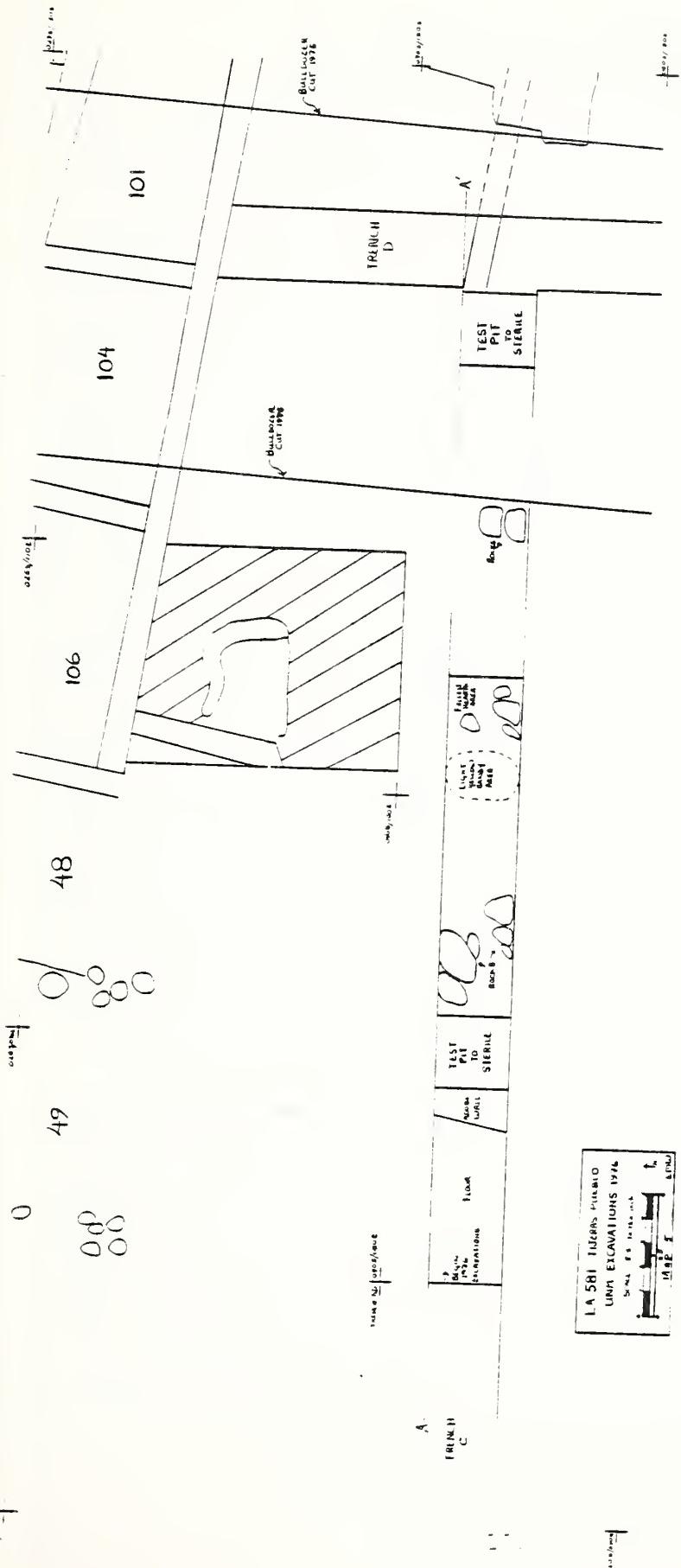
In the report of the 1975 season, I emphasized the importance of determining the chronological position and size of the outlying room blocks as well as the extent of the initial occupation in the main mound. In view of the fact that the greatest number of excavated rooms date to the middle period of occupation, efforts needed to be directed toward increasing our sample of rooms dating to the initial construction. Finally, in order to obtain data relevant to monitoring resources during both the initial and middle occupations, samples of trash deposits which could, with certainty, be related to the initial building episode were needed.

In view of these considerations, major goals of the 1976 field season were to (1) determine the limits of the initial occupation of the main mound, (2) excavate as many initial occupation rooms in the main mound as possible, (3) determine the size and excavate as many rooms as possible in an outlying room block, and (4) excavate trash deposits which could be related to the initial period. The strategy used to achieve each of these goals and our accomplishments with respect to each are discussed below.

### III. Summary of Field Work: Strategy and Results

In order to determine the spatial extent of initial construction in the main mound, three strategies were employed: trenching across the plaza area of the middle occupation; excavating subfloor fill in room 108, and excavating rooms 59 and 51. During the 1974 and 1975 seasons, mechanical removal of overburden in the areas of Room Blocks I and II (map 1b), revealed initial occupation rooms and walls which appeared to extend across what was later a plaza surface. In order to tie these architectural features to Room Blocks IV and V, which had been previously excavated (Judge 1974), Trench D was extended from Room Block I to Room Block V; Trench C was extended from the central plaza to meet Trench D; Trench I was excavated from Trench C south to room 85 and a small test trench immediately east of room 108 was opened (see map 1b). The trenching operation was successful in locating initial occupation walls and floors. Tests in Trenches C, D, and I were taken down until culturally sterile soil was reached. In Trench C, an initial occupation wall was located at 15.66 feet B.D. A fallen hearth at 18.16 feet B.D. in the same trench also relates to the initial occupation (map 5). Culturally sterile soil was reached at a depth of 16.41 feet B.D. in the eastern end of Trench C and at 19.31 feet B.D. in the western end of that trench. In Trench D,



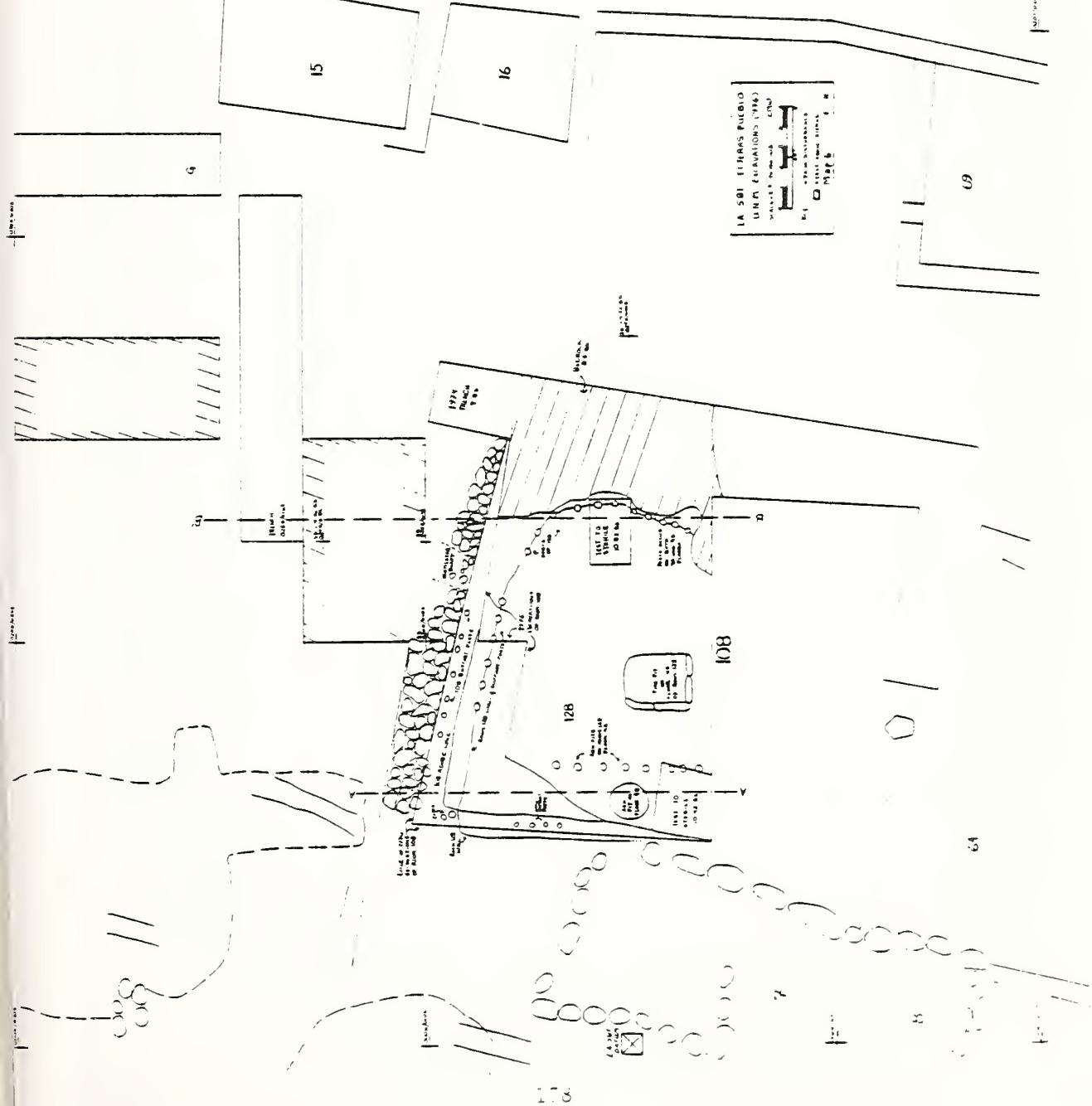
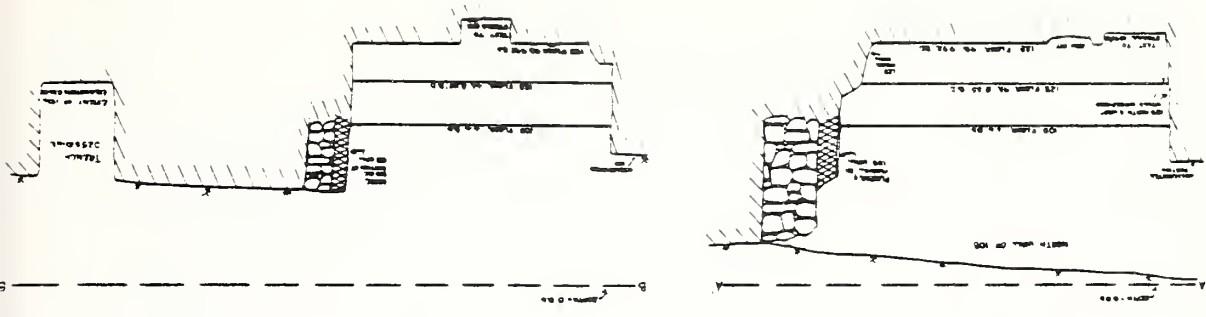




initial occupation floors were encountered between 19.61 feet B.D. and 20.46 feet B.D. in the northern end of the trench. The corner of a dismantled initial occupation room in the southern portion of Trench D occurred at 21.27 feet B.D. Culturally sterile soil was encountered at 21.36 feet B.D. in the northern end of Trench D and at 22.52 feet B.D. in the southern end of this trench. In both of these trenches, jumbles of rock, adobe chunks and apparently very mixed trash deposits indicate that the rooms of the initial occupation were deliberately demolished, probably when the middle occupation plaza was constructed. As in previous seasons, room numbers were assigned only when at least two walls and a floor of the same room were located. Thus, in Trench I, initial occupation rooms 137, 138 and 139 were defined. Floors in rooms 137 and 139 were encountered at 11.7 feet B.D. Subfloor tests were not made in these rooms, but it is likely that lower floors are present because a floor in room 138 was located at 14.2 feet B.D. and rooms 137 and 139 shared a common wall (map 1b). A subfloor test in room 138 encountered culturally sterile soil at 15.7 feet B.D. As can be seen on map 1b, the northern wall of rooms 80 and 81 were located in Trench I, providing the architectural evidence necessary to link Room Block II to Room Block IV. As in the cases of walls encountered in Trenches C and D, the initial occupation walls in Trench I were badly broken and eroded. A series of tree-ring dates obtained from room 108 indicates that this kiva was constructed in A.D. 1313, during the initial construction at Tijeras Pueblo. The short trench immediately east of this room was excavated in order to determine if room 108 had been completely enclosed within a cluster of rooms. Although time did not permit the excavation of this trench to culturally sterile ground, no walls were found joining room 108 from the east. The profile of this trench contained mixed deposits and adobe chunks characteristic of areas of the site which were subject to later remodeling during the middle period of occupation.

During the 1975 field season, the eastern half of room 108, the large, early rectangular kiva, was excavated. A subfloor test in the south-east corner of the kiva revealed some underlying debris. Because tree-ring dates obtained from interior wall supports and roof support posts dated room 108 to A.D. 1313, the earliest documented construction date at Tijeras Pueblo, further excavation of the subfloor remains was deemed necessary in order to determine if there had been an even earlier building period. In level 5B, 1.3 feet below the intact floor of room 108, seven small, circular ash deposits were encountered (map 6). Although ash deposits might have been related to dedicatory activities in the construction of room 108,







these extended for about a foot in depth and were associated with another floor, located at 8.44 feet B.D. The limits of this floor, rather than being the walls of room 108, were marked by 12 post holes (map 6). In order to avoid confusion, the room thus defined was given the number 128. As can be seen on map 6, it was possible to define only the south and east walls of room 128. Several feet of fill still overlay the north and west portions of the room. The room as outlined appears to be rectangular with rounded corners. A rectangular, slab-lined, ash pit was set into the floor. Subfloor tests revealed a second floor at 9.92 feet B.D. A circular, adobe ash pit was associated with this floor. Culturally sterile soil, consisting primarily of eroded limestone, was reached at 10.42 feet B.D., immediately beneath the circular ash-filled pit. Despite the unexpected depth of cultural material found underlying room 108, four tree-ring dates obtained from wood used in the construction of room 128 (appendix A) do not indicate an earlier beginning date for the occupation of Tijeras Pueblo. These four dates range from 1264 to 1327; and, as is indicated by the "vv" and "+vv" symbols, they are not cutting dates. Despite the depth of fill between floors, room 128 is not appreciably older than room 108; and the fill would seem to have resulted from remodeling activities rather than trash accumulation.

In the process of removing overburden in an attempt to define the limits of room 128, it was noted that there was paint adhering to the plaster of the north and east walls of room 108. Despite the fact that these walls were badly eroded and collapsing, sections of the walls which contained plaster were jacketed in plaster of paris, mapped, numbered and removed to the laboratory at UNM. Sally Heyer, a field school participant and graduate student in Art History, is currently working on exposing and recording the wall paintings under the direction of Dr. J. J. Brody, Director of the Maxwell Museum of Anthropology. Although this work is in its preliminary stages, it is noteworthy that one small anthropomorphic figure and a ground line have been exposed. Dr. Brody (personal communication 1976) has suggested that the kiva paintings at Tijeras Pueblo may, on stylistic grounds, be transitional between the small-figure, geometric art of the Chaco area and the large-figure, composed murals of Pottery Mound (Hibben 1975).

In order to determine the western extent of initial construction in the main mound, room 59 was excavated and room 51 tested (map 1b). During the 1974 field season, the masonry walls defining rooms 107 and 109 were located under room 64 (map 1b). These walls appeared

to have been deliberately leveled in order to construct room 64 and the adjacent rooms (59, 60, 61 and 62). The masonry walls rested on bedrock, and there was virtually no trash fill within the early rooms. During the 1975 field season, crews further explored the extent of masonry construction underlying Room Block III, and it was noted that the western wall of room 107, which underlay room 60, was considerably thicker than the north and south walls of that room and, therefore, may have marked the western limit of this construction in the main mound. The lack of cultural debris within the underlying masonry walls left some uncertainty with respect to interpreting them as representing the initial period of construction despite the fact that they rested on bedrock. A cutting date of A.D. 1262 was obtained from wood within the fill of room 59 at 3.50 feet B.D., about 1 foot above the floor. A second tree-ring date of A.D. 1268, from a specimen with several missing rings, was obtained from the same level. Two tree-ring dates of A.D. 1245 and A.D. 1310, neither of which are cutting dates, were obtained from fill in room 51, just above bedrock. Unfortunately, none of these samples were from hearths or roof fall. They would, nevertheless, indicate that both the leveled masonry walls and the offset adobe walls of rooms 51, 59, 60 and 61 probably relate to the initial period of construction at Tijeras Pueblo. The masonry walls located under rooms 51 and 59 followed the pattern previously noted. The west walls were much more massive than the north, south or east walls located and probably do represent the western extent of building during the initial period. The masonry walls were again set into about an inch of clean fill directly above bedrock. Each section of masonry wall uncovered seems to have been deliberately leveled when the offset walls of the later adobe rooms were built. The rebuilding, in adobe, suggests that the configuration of the adobe room cluster was more important than the architectural stability which would have resulted from using the leveled masonry as footing.

The northern and eastern extents of the initial construction in the area of Room Block I had been determined in 1974 (Cordell 1975:5-7). Excavation during 1975 revealed the northern limits of this construction in the area of Room Block II, and the southern extent of this construction in Room Block V. Shaded areas on map 1b indicate trash deposits excavated east of Room Blocks I and V, south of Room Blocks IV and V, and north of Room Block III. Since each of these was beyond areas of construction, the location of the western extent of the initial masonry construction to the west in Room Block III and the trenches extending across the central area of the main mound were successful in delimiting the size of initial construction in the main mound.

The second goal of the summer, the excavation of as many initial occupation rooms in the main mound as possible, was largely met through the excavation of rooms 122, 126, 131, 132 (map 8) and "area 125," in addition to the work done in rooms 59, 108 and 128 (discussed above). Rooms 122, 126, 131 and 132 are north of Room Blocks I and II (map 1b), and each is also north of the massive masonry wall which marked the boundary of Tijeras Pueblo during the middle occupation. Each of these rooms was difficult to delimit in that all walls were extremely eroded adobe and the fill largely adobe wash. In all cases, however, floors were well preserved. Two cutting dates from room 122 yielded an age of A.D. 1335, which falls within the proposed initial occupation time span. None of these rooms had interior floor features, and it is likely that they may have been storage or work rooms rather than habitation rooms. In rooms 122, 126, and 131, the floors consisted of angular slabs and cobbles set into an adobe matrix. Room 132 with two floors, each of adobe, had apparently been remodeled. All of these rooms were constructed on culturally sterile ground. It was hoped that enough time would permit the excavation of one habitation room dating to the initial period of construction in the central portion of the main mound, despite the fact that such rooms are covered with several feet of overburden and had, in previous seasons, been excavated only when the overburden was mechanically removed. It was hoped that the two walls exposed south of room 112 in Trench B marked the northern and southern walls of the same room and this area, at first designated room 125, was selected for excavation. After removal of extremely mixed fill, consisting largely of eroded adobe and adobe chunks characteristic of initial rooms which had been dismantled, it was discovered that the two walls did not belong to the same room. The designation was changed to "area 125" as shown on map 1b. Unfortunately, time did not permit locating either a floor or a west wall which would have enabled us to clarify the architectural picture.

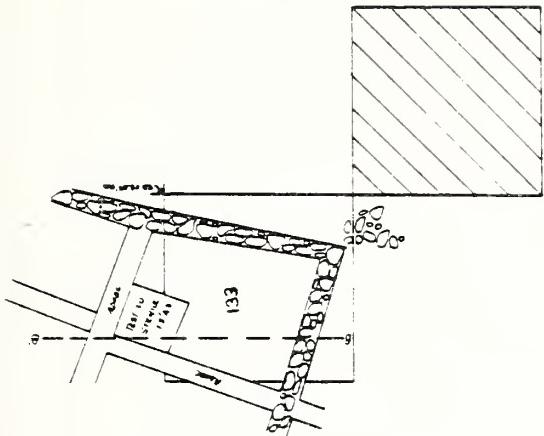
The designation Room Block VIII was given to the outlier located about 200 feet east of the great kiva, designated as Mound F on Mera's sketch map (Judge 1974:5-6 and this report map 7), which we wanted to intensively test during the 1976 season. Part of Room Block VIII had been surface stripped in 1973, but at that time no rooms had been located. Our experience with eroded adobe of the initial occupation period, and the anticipation that all of the outlying room blocks probably were of this period encouraged us to persist in our efforts to define rooms in this area. We employed several strategies in order to locate and define rooms (see appendix C, this report) and were rewarded by finding the rooms and walls indicated on map 7. Time permitted the excavation of rooms 129, 130, 133,



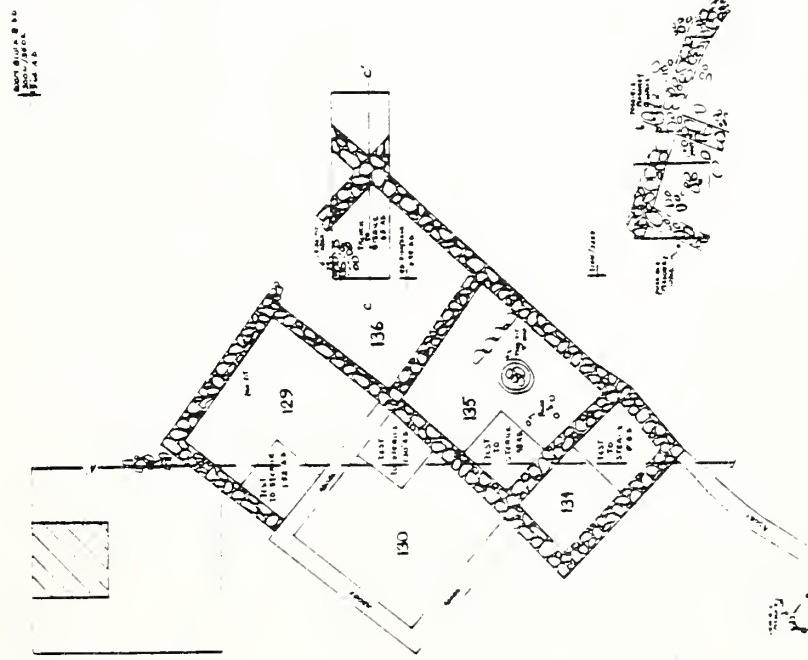
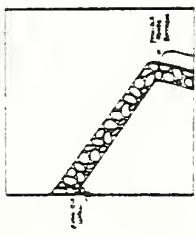
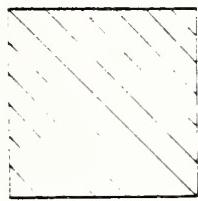


ଦେବତା ଛୋ ପଞ୍ଚମୀ କରିବାକୁ

Digitized by srujanika@gmail.com



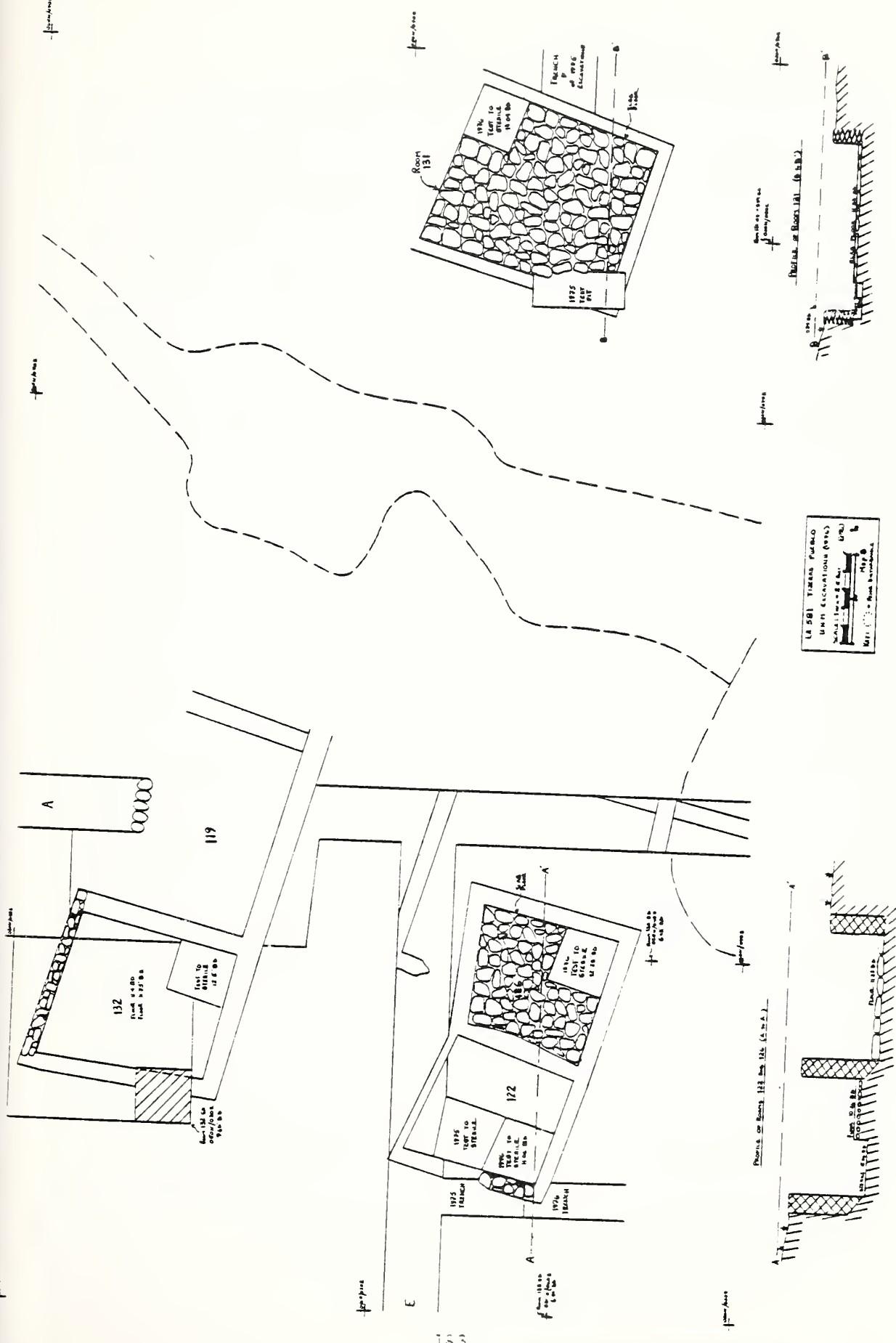
**PLAN OF ROOM BLOCK B** (Rooms 129, 130, 133, 134, 135, 136)



卷之三









134, 135, and 136 in Room Block VII. On the basis of the size of the rooms excavated and noting that Room Block VIII consists of at least two separate structures, we estimate that there are from 18 to 25 rooms in the entire outlier (appendix C, this report). Fill in Room Block VIII consisted of hard-packed adobe wash with little cultural debris. Room construction seems to have been primarily of adobe, but crude masonry characterized most of the wall footings. Floors were, in general, well defined. Of the five rooms excavated, only two yielded tree-ring dates. A date of A.D. 1313, unfortunately not a cutting date, was obtained from the floor of room 134. A date of A.D. 1351 was obtained from beneath the floor of room 135. The latter date was also obtained from wood which had an unknown number of missing rings. Two other tree-ring dates relate to Room Block VIII. A cutting date of A.D. 1305 was obtained from wood associated with the isolated wall and corner segments exposed south of room 135. The final date obtained, A.D. 1360, which is also not a cutting date, came from the second level of trash in 200N/370E (map 7) which is probably associated with Mera's Mound E (Judge 1974:6), south of the rooms which we excavated. In general, the extremely eroded nature of the construction in Room Block VIII, the lack of wood from roofing material, the relatively early ceramics obtained from fill, and the lack of any tree-ring dates in the 1390's lend credence to the notion that Room Block VIII was constructed and used during the initial occupation of the site and was abandoned prior to, or at the time of, the middle period of building at Tijeras Pueblo.

Before the 1975 season, extensive samples of trash deposits had been excavated only in the main mound. As indicated in previous reports, these have been difficult to interpret with respect to the various building episodes represented in the main mound. In some instances, the presence of adobe wash in the stratigraphic tests indicated periods of site disuse, or at least a lack of maintenance of nearby walls. Levels of adobe wash were not always associated with statistically significant disconformities in the various types of decorated ceramics which might also indicate periods of site disuse. In other cases, ceramic disconformities were noted between adjacent levels which did not show evidence of adobe wash. During the 1975 field season, trash from Room Block VII was sampled (map 1b); and, in the report of that season's work, I suggested that this sample of trash related to the initial period of construction on the main mound.

Two strategies were utilized during the 1976 season to obtain samples of trash deposits which could, with more certainty, be related to the

initial phase of building. First, in the general reorganization of the laboratory procedures, to be discussed below, the "simplified" field school ceramic typology was abandoned, and students were asked to sort all ceramics into the standard, published types recognized at the site. Second, grids of trash were excavated only in areas of the site where there was architectural evidence that the sample taken represented initial construction and where the intrusion of later debris would be unlikely. Thus, in the main mound, two grids (00N/120E and 000N/130E) north of Room Block I were excavated (map 1b). These grids were selected because they lay immediately north of the northern outer wall of the initial period construction in Room Block I, as determined during the 1974 excavation (Cordell 1975:7), yet several feet south of the large masonry wall which marked the northern limit of the pueblo during the middle period of occupation. Each of these grids then should contain trash which was deposited when the pueblo was first constructed and to have been sealed by overlying room floors during the occupation dating from the A.D. 1390's. Each of these adjacent grids was excavated to culturally sterile soil.

Samples of trash deposits from outlying room blocks were desirable for two reasons. First, in view of the contention that these constructions date to the initial building episode at Tijeras Pueblo, the trash should augment our sample representing the initial period of occupation. Second, it was felt that samples of trash might be used to indicate the relationship of the outliers to the main mound. For example, it would be important to know if the outlying rooms were used for limited activities or whether they were socially distinct habitation areas. In order to obtain the data appropriate to answering these questions, grid 200N/370E and the southeast half of grid 280N/320E were excavated in Room Block VIII (map 7), and grid 160N/030E was excavated in Room Block VI (map 1b). As had been the case in the 1975 excavation associated with Room Block VII (map 1b), trash deposits adjacent to the outliers were difficult to locate and were relatively shallow when tested. Grid 200N/370E contained debris to a depth of only 2.4 feet; and, unfortunately, although associated with the outlier, it is not immediately adjacent to the rooms we excavated in Room Block VIII. Grid 280N/320E is bisected by a wall with a possible adobe buttress (map 7). The southeastern portion of the grid, outside the room wall, contained trash to a depth of only 1.87 foot. In the process of trying to locate trash associated with Room Block VI (the "6-room" outlier excavated in 1971 (Judge 1974:43)), additional walls and corners were uncovered (map 1b). We now estimate the size of this outlier to be between 12

and 15 rooms. The trash sample was taken from grid 160N/030E, which was devoid of architectural features. The depth of the deposit varied from 2.1 feet to 3.0 feet.

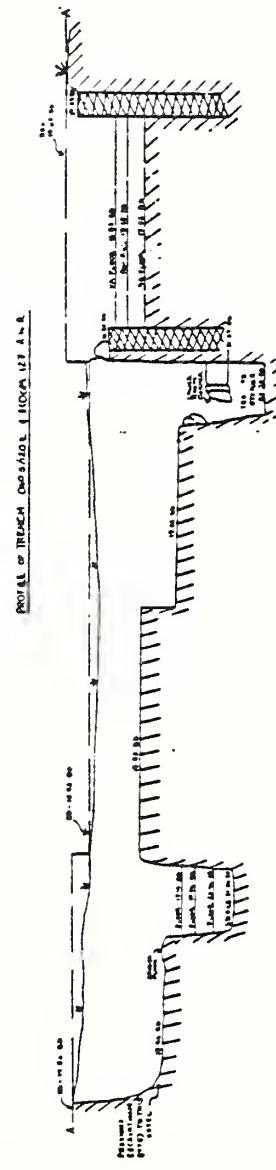
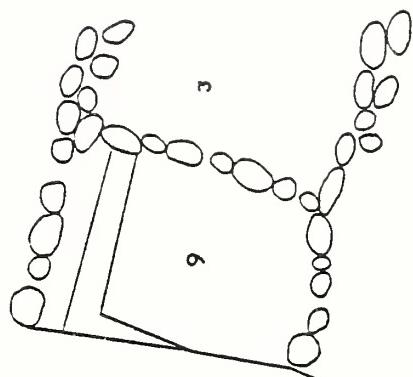
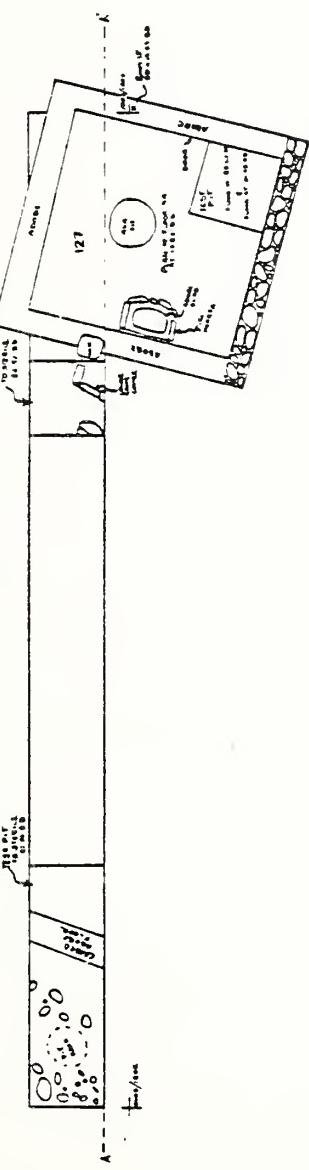
As a result of work completed during the 1976 season, comparative examination of trash from the main mound, Room Blocks VI, VII, and VIII should provide information about differential access to or processing of resources at these locations, differential utilization of ceramic types by the residents of these different areas, and possibly, through both micro-stylistic and technological variability in ceramics as well as analysis of human skeletal remains, the relationships between the residents of Tijeras Pueblo during its initial occupation and those of the middle period of construction which was limited to the main mound.

Although not immediately related to the goals of the 1976 season, the excavation of room 127 (map 1b and map 9) was completed and proved to be informative. In his report, Dr. Judge (1974:11) had indicated that, on the basis of room depth, Tijeras Pueblo might have consisted of rooms of more than one story. Our subsequent work in Room Blocks I, II, III and IV provided no convincing evidence that this was the case. The excavation of room 127, in Room Block V, demonstrated the existence of two stories. This and a reexamination of notes from the 1971-1973 seasons indicate that the middle occupation of the main mound contained two-story rooms in the southeastern portion of the site only. The evidence of a second story in room 127 consisted of a broken floor and a slumped firepit under roofing material and above an intact floor with both fire and ash pits. The presence of an offset corner and floor in Trench D, below and slightly north of room 127 (map 9), indicates that room 127 related to the middle and not the initial period of construction. Five tree-ring dates were obtained from room 127 (appendix A). Of these, the dates A.D. 1287 and 1311 are cutting dates. A date of A.D. 1369, obtained from wood from which an unknown number of outer rings are missing, came from the same level of the room as the earlier cutting date and would indicate that the latter represents reutilization of roofing material rather than a construction date.

#### IV. Revisions in Recording and Analytic Procedures

One minor change in methods of field recording was initiated in 1976. In past years, trenches were designated as features and given the number of the sub-datum point from which measurements were taken. Thus, 100N/100E F-1 might refer to a test trench of any width within







grid 100N/100E. Cultural features, such as firepits, floors or burials, as well as additional trenches or test pits within the same grid, had been given sequential feature numbers. Thus, 100N/100E F-2 might refer to a second trench or to a wall; and it would be necessary to check the appropriate feature forms to discover what the label reference was. During the 1976 season, all excavation units such as trenches and test pits were recorded with their precise coordinates, although depth measurements continued to be made from only one sub-datum point. Thus, a 3-foot-wide trench might be labeled 100N/103E. Cultural features within grids or test trenches were given sequential feature numbers as in the past. No changes in the methods of designating test trenches or test pits within rooms were made.

A complete reorganization of the field school laboratory procedures was made during 1976, one which I believe greatly improved our preliminary analysis. Instead of having each crew of three students analyze the material which they had excavated, students were asked to select one of three fields of specialization with the option of changing to another field after the fourth week of work. Separate laboratories were provided for ceramic, lithic and faunal material, and more detailed analysis was required during each laboratory session. Although the space requirements were considerably greater than they had been in previous seasons, each lab room contained reference materials appropriate to the kinds of items being studied, and there was considerably less confusion during lab hours. Student enthusiasm both in analysis and in excavation increased greatly as each student felt more expert in identifying particular items recovered. Some students came to lab 4 nights each week, instead of the required 2, so that they might learn to analyze each of the three categories of material. More detailed recording of data was accomplished, and a better understanding of the complexity of analysis was transmitted to the students.

The fewest changes in recording for computer files were made with respect to lithic items. For each excavation unit (level, feature, etc.), the number and percent of chipped stone artifacts, flakes and ground stone items were recorded. The previous distinction between modified and unmodified flakes was dropped, because it had been too often arbitrarily applied. In addition to this minimal information, however, lithic analysis was devoted to precise identification of parent material. Forms containing information on hardness, color, porosity, grain size, etc., were filled out for each lithic. These data should provide the basis for a study of the range of lithic sources used by the inhabitants of Tijeras Pueblo

through time and trends in selectivity with respect to the physical properties of sources. This kind of study more directly fits our general research interests in that we will be able to determine whether or not wider trade networks were established as a response to stress, whether access to a specific raw material source was important to maintain, and whether or not changes in the catchment area (Vita-Final and Higgs 1970) for lithic sources occurred through time.

In the analysis of faunal material, students were expected to complete two sets of forms as well. The computer form contains the numbers and percent of each of the following for each provenience unit: turkey bones, other bird bones, foetal artiodactyl bones, adult artiodactyl bones, rabbit bones, other rodent bones, carnivore bones, reptile bones, and unidentified fragments. In addition, on card format, students recorded the anatomical element, genus and/or special (if possible) condition (whole, distal end, shaft, etc.), length of long bone and rib fragments, charring and location and type of butchering marks. Only the limited size of our comparative collection, which was borrowed from the osteology laboratory, prevented at least identification of genus of most bones; and it is a credit to the students that the category "unidentified fragments" was used sparingly.

As mentioned above, the simplified ceramic categories used by the field school in the past (Galisteo B/W, Other B/W, Agua Fria Glaze/Red, Other Redwares, Plainware, Indented Corrugated, Smeared Indented Corrugated and Los Lunas Smudged) were abandoned, and students were required to identify sherds with respect to the standard, published types. The computer records contain the number and percent, by provenience unit, of each of the following types: Plainware, Indented Corrugated, Smeared Indented Corrugated, Agua Fria Glaze/Red, San Clemente Glaze Polychrome, Los Padillas Glaze Polychrome, Cieneguilla Glaze/Yellow, Heshotuatla Glaze Polychrome, Galisteo B/W, Santa Fe B/W, Wiyo B/W, Chupadero B/W, Other B/W and Los Lunas Smudged. In preliminary analysis of the Tijeras Pueblo data, ceramic frequencies have been used almost exclusively for chronological information, and summary statements have been made based on the relative proportions of Black/White to Redwares. In the report of the 1975 season, I pointed out the inadequacy of this approach. The more detailed analysis of the 1976 season (which will be checked for errors in classification) provides the basis for clarifying the chronological situation as well as for examining spatial clustering

of ceramic types within temporal periods as determined by tree-ring dates. It should be noted that on the basis of published dates (Robinson, et al., 1972; Honea 1966), the teaching assistant reports for the 1976 season (appendices C-E) refer to relative proportions of "Early" to "Late" ceramic types. The "Early" types referred to are: Heshotuatla Glaze, Galisteo B/W, Santa Fe B/W, Wiyo B/W and Los Lunas Smudged which span the period from about A.D. 1200 to about A.D. 1390. The "Late" types are: Agua Fria Glaze, Los Padillas Glaze, San Clemente Glaze, and Cieneguilla Glaze, which date from about A.D. 1315 to A.D. 1490. Chupadero, which spans the entire time period and beyond, is ignored. Most importantly, in view of the fact that the detailed ceramic analysis done during 1976 is not comparable to the preliminary analyses done over the past 5 years, no discussion of changes in ceramic frequencies either in successive stratigraphic levels or in reference to architectural observations is included in this report but will be a feature of planned publications.

Finally, due to the cooperation of the osteology laboratory at UNM and funds provided through the Maxwell Museum of Anthropology, a new procedure was introduced in the recording and removal of human skeletal material. Mr. David Weaver, an advanced graduate student in biological anthropology, was our "on call" osteological expert. Whenever a burial was encountered, a phone call was made to campus; and Mr. Weaver, who was working in the osteology laboratory, arranged his work so that he could come out to the site as soon as possible. He actively participated in the removal of each burial, explaining to the students where the skeleton was oriented, directing and observing the exposure and recording of the burial, and, with detailed explanation for the students, determining age and sex of the individual recovered. The advantage of this system was twofold. First, the students learned a great deal more about osteological observations than they otherwise could have. Second, Mr. Weaver, whose complete analysis of the burials is included as appendix B of this report, was able to evaluate the archeological context of each burial. I recommend this type of procedure, whenever it is possible, although it clearly depends upon having one's archeological site within "commuting distance" of the facilities of an osteological lab.

## V. Experimental Procedures

In one sense, of course, all of the innovations in our procedures, which are discussed above, may be considered experimental. They were, however, instituted as modifications or changes with the expectation that they would not be subject to further change. On the other hand, we decided to invest some of our efforts in exploring the utility of subsurface mapping using electronic resistivity equipment with few expectations about its success. As noted in the 1975 report, the presence of a great kiva north of the main mound was discovered, and its approximate dimensions determined. The fill within this structure is exceptionally hard and nearly devoid of cultural material. For this reason, I did not wish to use field school students to excavate the feature. Therefore, mapping of the kiva seemed an ideal test for resistivity.

Stephen Fosberg, who is working toward a doctorate in anthropology with an emphasis in geological applications in archeology, supervised the resistivity work. Arrangements were made to borrow the equipment from the Geology Department at UNM. We believe that Tijeras Pueblo is an ideal site with which to demonstrate the versatility of resistivity work. We hoped that if the mapping of the kiva proved successful, we could, by extrapolating the positions of unexcavated walls in Room Block VIII, discover whether or not the equipment would enable us to locate adobe as well as masonry walls. Also, because we know the depth of trash deposits in both the main mound and in Room Blocks VI and VIII, we could determine the utility of resistivity in discriminating fill from culturally sterile ground. Unfortunately, I can only report that our results were encouraging but limited; but this had nothing to do with resistivity as a technique or the expertise of the staff. Due to a forest fire in the Jemez Mountains which "stranded" a group of geology students with the resistivity equipment, we had the equipment at Tijeras for only 2 days. Our work demonstrated that resistivity was successful in locating the walls of the great kiva, despite considerable masonry fall. We did not have time with the equipment to pursue the matter further. In view of this limited success, I hope to continue further experiments when time and the Geology Department permit.

## VI. Tree-Ring Dates and Chronology

Appendix A contains a list of tree-ring dates obtained from both the 1975 and 1976 season's work. Wood preservation at Tijeras Pueblo is excellent, and a total of 331 dates have been obtained from the site. The information from the 1976 season does not alter the outlined chronology of the site as discussed in the report of the previous year, and several tentative evaluations made at that time have been substantiated. For example, I had suggested that the great kiva appeared to be contemporaneous with the room block kiva, room 108, and that this structure as well as the outliers were probably built during the initial phase of construction at Tijeras Pueblo. The single, exceptionally fragile wood sample obtained from the burned "floor" of the great kiva yielded a date of A.D. 1313vv (TJP-648 appendix A) and would seem to substantiate the first conclusion. Both the architectural evidence and the dates obtained in the excavation of Room Blocks VI and VIII confirm that these outliers relate to the initial occupation as well.

All of our work indicates that, although the site was utilized prior to A.D. 1300, the initial construction of the several room blocks took place during a period of general population aggregation in the canyon which dates to about A.D. 1310. This initial period of occupation was the largest at the site, and there was nearly continuous construction and remodeling during the initial occupation. The configuration of Tijeras Pueblo during the early and middle portions of the 14th century appears to have been roughly semi-circular with the open area to the north. The great kiva was located centrally to the room blocks.

The middle period of occupation was confined to the main mound, outlying room blocks and the great kiva having been abandoned. This occupation dates to the early 1390's, and the population of the site seems to have been reduced to about half of its original size. The middle occupation consisted of a roughly U-shaped configuration of rooms partially surrounding a plaza area open to the east. A thick masonry wall bounded the pueblo on the north, and trash seems to have been deposited just beyond this wall. Ceramic evidence indicates that this occupation lasted until no later than about A.D. 1425.

No new information relating to the ephemeral late occupation was obtained during 1976. As discussed previously, evidence for reuse of the site sometime after A.D. 1425 consists only of a few rectangular hearths found on the surface, a few badly eroded upright masonry

slabs in the area of Room Block III, and the presence of three Glaze D or E sherds in the disturbed area of Room Block II. Although in the report of our 1975 work, I suggested that these might relate to use of the site during the mid or late 15th century, it is possible that these remains may indicate brief use of the site by refugees from the 1525 Plains Teya raid on the Galisteo Pueblos, since the Galisteo peoples are reported to have moved to such nearby sites as Paa-ko and San Antonio (Lambert 1954:5). Although our three late glaze sherds hardly comprise an adequate sample, they should be compared to those from the "refugee" period of these two other sites.

### VII. Burials

A total of 18 burials were recovered during the 1976 season (see appendix B for the analysis of these), bringing the total sample for the site to 54 individuals. Of these 54, 15 are adult females, 20 adult males, and 19 infants and young children. Nearly miraculously, this number is just sufficient to pursue the genetic distance methods developed by Lumpkin (1976). As might be expected, the most common pathologies reflected in the skeletal remains are pre-mortam tooth loss and osteoarthritis. There is also, however, an unusually high frequency of spina bifida (14.8% of the Tijeras sample compared to about 1.5% in modern populations), a congenital malformation of the spinal column. Because both genetic and environmental factors are important in the etiology of spina bifida (Sever 1976) and some of the suggested environmental agents could not have been present at Tijeras Pueblo, a report on this disorder at Tijeras is currently in preparation.

### VIII. Conclusions and Evaluation

The goals which we had set for the 1976 season--establishing the extent of the initial occupation of the main mound, obtaining samples of trash which are associated with the initial period of occupation, clarifying the architectural chronology of Room Block III, and extensively sampling one of the outlying room blocks--were accomplished. Although only about two-thirds of the entire site has been excavated, the level of redundancy in data obtained in 1976 certainly justifies ending our current field project at the site. Most of our specific research questions require a great deal of analysis, but the data for these studies have been obtained and work on them is in progress.

With respect to overall evaluation, two observations would seem to justify comment. First, the field school project has, I believe, adequately demonstrated that much valuable information can be obtained by excavating sites which are not in "pristine" condition. Ideally, of course, archeologists prefer to work with a site that has not previously been tested, but such sites are, unfortunately, becoming increasingly rare. The Tijeras project should encourage professional archeologists to reexamine the research potential of sites which do not meet ideal standards. Second, a number of professional archeologists who have visited the site during the past three seasons have commented on its undesirability as a training site for students. These remarks have been engendered by observing the architectural complexity at the site and probably by notions that students should start with something simple. My experience leads me to an opposite conclusion. Archeology is not simple, and I believe that the best training of students is accomplished by a clear demonstration of the myriad complexities involved and the concomitant necessity for meticulous observation and caution at all times.



## IX. References

- Cordell, Linda S.
- 1975      The 1974 Excavation of Tijeras Pueblo, Cibola National Forest, New Mexico. Archeological Report No. 5, USDA Forest Service, Southwestern Region, Albuquerque, New Mexico.
- 1977      The 1975 Excavations of Tijeras Pueblo, Cibola National Forest, New Mexico. Ms on file. USDA Forest Service, Southwestern Region, Albuquerque.
- Hibben, Frank C.
- 1975      Kiva Art of the Anasazi at Pottery Mound. K. C. Publications, Las Vegas, Nevada.
- Honea, K. M.
- 1966      Report to the Eighth Southwestern Ceramic Seminar, Santa Fe. Laboratory of Anthropology. MS.
- Judge, W. James
- 1974      The Excavation of Tijeras Pueblo 1971-1973: Preliminary Report, Cibola National Forest, New Mexico, Archeological Report No. 5, USDA Forest Service, Southwestern Region, Albuquerque, New Mexico.
- Lambert, Marjorie F.
- 1954      Paa-ko, Archaeological Chronicle of an Indian Village in North Central New Mexico, Monograph No. 19, School of American Research, Santa Fe, New Mexico.
- Lumpkin, Charles K., Jr.
- 1976      A Multivariate Craniometric Analysis of Selected Southwestern Archaeological Populations, Unpublished Ph. D. Dissertation, University of New Mexico.
- Robinson, W. J., et al.
- 1972      Tree-Ring Dates from New Mexico, I.O.U. Laboratory of Tree-Ring Research, University of Arizona, Tucson.

- Sever, Lowell E.
- 1976 "Anencephalus and Spina Bifida: an Ecological Approach," Human Ecology, Vol. 4, No. 3, pp. 209-222.
- Vita-Finzi, C. and E. S. Higgs
- 1970 "Prehistoric Economy in the Mt. Carmel Area of Palestine: Site Catchment Analysis," Proceedings of the Prehistoric Society, Vol. 36, pp. 1-37.

X. Appendices

Appendix A  
Tree-Ring Dates  
1975 and 1976 Seasons



## LABORATORY OF TREE-RING RESEARCH

## Archeological Date Report

Site Tijeras Pueblo (1975 Collection)Page 1 of 2Accession Number A-358 Control Number  Date 5/10/76

Provenience	TRL Number	Field Number	Species	Dating Inside	Outside
Room 60	TJP-599	5A-7.2	PNN	1248p	- 1289r
Room 108	TJP-600	2A-7.1	JUN	1178p	- 1235v
"	TJP-624	3A-7.14	PP	1233p	- 1264+c
"	TJP-623	3A-7.13	PP	1244p	- 1284c
"	TJP-618	3A-7.5	PP	1239p	- 1294r
"	TJP-621	3A-7.10	PNN	1164p	- 1297r
"	TJP-620	3A-7.8	PNN	1170p	- 1303vv
"	TJP-626	4A-7.1	PP	1240p	- 1307+c
"	TJP-606	2C-7.6	PNN	1185±p	- 1313vv
"	TJP-622	3A-7.11	PP	1236p	- 1313r
"	TJP-619	3A-7.7	PNN	1071p	- 1315++vv
"	TJP-602	2B-7.2	PNN	1256	- 1317vv
"	TJP-607	2C-7.7	PNN	1198p	- 1319+vv
"	TJP-604	2C-7.3	PNN	1333p	- 1367v
"	TJP-605	2C-7.4	PNN	1280p	- 1367v
"	TJP-608	2D-7.1	PNN	1332p	- 1368c
"	TJP-609	2D-7.3	PNN	1313p	- 1377r
"	TJP-612	2F-7.1	PP	1328p	- 1379vv
Room 111	TJP-627	4A-F1-7.2	PNN	1358p	- 1389r
Room 112	TJP-637	4B-7.4	JUN	1235p	- 1302r
"	TJP-640	5A-7.1	PNN	1236p	- 1317r
"	TJP-638	4B-7.6	PNN	1334p	- 1373c
"	TJP-635	4A-7.7	PNN	1354p	- 1385r
"	TJP-634	4A-7.4	PNN	1355p	- 1386r
"	TJP-631	2B-7.2	PNN	1358p	- 1387r
Room 115	TJP-642	2A-T1-7.2	PNN	1290p	- 1346r
"	TJP-643	2A-7.1	PNN	1297p	- 1346r
"	TJP-644	2A-7.3	PNN	1302p	- 1349v
"	TJP-641	2A-T1-7.1	PNN	1297p	- 1349r
"	TJP-645	4A-7.1	PNN	1297p	- 1358v

## LABORATORY OF TREE-RING RESEARCH

## Archeological Date Report

Site Tijeras Pueblo (1975 Collection) Page 2 of 2Accession Number A-358 Control Number \_\_\_\_\_ Date 5/10/76

Provenience	TRL Number	Field Number	Species	Dating	
				Inside	Outside
Room 116	TJP-646	2D-7.1	PNN	1198p	- 1284vv
"	TJP-647	4A-7.1	PNN	1271p	- 1359v
310N/100E-T1	TJP-648	7.1	PNN	1240p	- 1313vv
000N/040E-XA	TJP-651	7.2	PNN	1359p	- 1387r
000S/040E-XA	TJP-649	7.1	PNN	1331p	- 1380vv
010S/040E-XA	TJP-652	7.2	PNN	1344p	- 1387r
020S/040E-XA	TJP-654	7.1	PNN	1352p	- 1386r
"	TJP-655	7.2	PNN	1337p	- 1386r
"	TJP-658	7.5	PNN	1355p	- 1387r
020S/050E-XA	TJP-659	7.1	PNN	1329p	- 1387vv
"	TJP-660	7.2	PNN	1344p	- 1392+v

## LABORATORY OF TREE-RING RESEARCH

## Archeological Date Report

Site Tijeras Pueblo (1976 Collection) Page 1 of 1Accession Number A-380 Control Number \_\_\_\_\_ Date 11/5/76

Provenience	TRL Number	Field Number	Species	Dating	
				Inside	Outside
Room 51	TJP-663	2H-T3-7.2	PNN	1161	- 1245vv
"	TJP-662	2H-T3-7.1	PNN	1238p	- 1310vv
Room 59	TJP-664	2D-T1-7.1	PNN	1210p	- 1262B
"	TJP-665	2D-T1-7.2	JUN	1223	- 1268vv
Room 108	TJP-666	5C-7.1	PNN	1238	- 1298+vv
Room 122	TJP-667	2C-7.1	PNN	1264	- 1317+vv
"	TJP-670	4A-7.1	PNN	1258p	- 1335B
"	TJP-671	4A-7.2	PNN	1263p	- 1335B
Room 127	TJP-676	3A-7.4	PNN	1246p	- 1287rB
"	TJP-678	YA-7.1	PP	1263p	- 1311r
"	TJP-675	3A-7.3	PNN	1253p	- 1320vv
"	TJP-677	3A-7.1	JUN	1229p	- 1369vv
"	TJP-672	2A-7.1	PNN	1319p	- 1370vv
Room 128	TJP-681	5A-7.2	PNN	1190p	- 1264+vv
" -	TJP-683	5A-T1-7.1	PNN	1207p	- 1272vv
"	TJP-682	5A-7.3	PNN	1193p	- 1287+vv
"	TJP-686	5C-7.2	PNN	1240	- 1327+vv
Room 134	TJP-688	4A-7.2	PNN	1220	- 1313vv
Room 135	TJP-689	6A-T1-7.1	PNN	1256	- 1351vv
042S/080E	TJP-692	2D-7.3	PNN	1257p	- 1352r
200N/370E	TJP-693	2B-T2-7.1	PNN	1307p	- 1360+vv
300N/310E	TJP-696	1A-7.1	PNN	1262	- 1305r



Appendix B

Skeletal Remains from  
1976 Excavations

by  
David S. Weaver



During the 1976 field school session, 18 burials were recovered. In addition, approximately 50 unattributed bones and fragments were recovered from the surface or from screened dirt. This report will discuss each of the 18 burials separately. It is hoped that a subsequent report will analyze the entire collection from the Tijeras Pueblo sessions and attempt to deal with the skeletal population in relation to other sites around New Mexico. A sufficient sample exists to attempt to classify the skeletal population within the New Mexico samples using the method developed by Lumpkin (1976).

The archeological condition of the burials is generally good, and many of the miscellaneous bones mentioned above were subsequently attributed to the proper burials. The good condition is due to the fact that most of the burials were found in trash deposits, where the drainage and soil are most favorable for the preservation of skeletal remains. Rodent activity in the trash deposits was widespread, however, resulting in the disturbance of many of the burials. In one case, Burial 44, a mouse skeleton and nest were found in the thoracic cavity of the individual. The one definite subfloor burial, Burial 48, was probably a newborn and had been buried under the northeast corner of the room, a procedure that is reported ethnographically for some pueblo groups (Lange 1968:420).

The skeletal health of the represented individuals was generally good. The results of advancing age, which are typical of early pueblo peoples, are visible in most individuals over 30 years of age; arthritis, pre-mortem tooth loss, caries, and severe tooth wear are all common. Many of the caries resulted in abscesses, usually around the roots.

Cultural modification of cranial shape is present only as lambdoidal flattening. The type, degree, and presence of flattening will be discussed with each burial.

As much as possible, each burial has been measured for a series of standard anthropometrics and indices have been computed. Tables 2 and 3 provide the cranial and post cranial measurements and indices, respectively.

Each burial was inspected visually and radiographically for anomalies and pathologies. The results of inspection are provided as each burial is discussed.

Table 1 provides a summary of the sex, estimated stature, age, and estimated cranial capacity of each individual. Sex and age were

determined using the methods described in Bass (1971). Stature was estimated using the regression formulae of Trotter and Gleser (1952, 1958). Cranial capacity was estimated using the Lee and Pearson formulae (Olivier 1969:48), which are felt to be accurate within 50 cm.

As with other pueblo populations, the abrasive nature of the prepared food has made aging by tooth wear extremely unreliable. Dentition was therefore used to estimate age only through observation of the sequence of eruption of teeth in infants and children (Meredith 1946).

Determination of age at death was particularly difficult for the study population. Children and infants were aged primarily using degree of dental development. Closure of the fontanelles and the metopic suture were also used. A standard method aging by length of long bones (Johnston 1962), was used, although the result was frequently as much as 1 year younger than the dental estimate. Nutrition severely affects rate of growth of long bones (Krogman 1972:55) and has less effect on teeth (Meredith 1946:65). If any nutritional stress were acting on this population, one observed result would be the discrepancy noted between bone length and dental age estimates. Dental estimates were, therefore, preferred when available. Adults were somewhat easier to age, as most of the usual methods-- pubic symphysis (Todd 1920), cranial sutures (Todd and Lyon 1924, 1925), presence and progress of arthritis (Brothwell 1965:145-5), changes in the scapula (Graves 1922), porosity of bone (Bass 1971), and various dental characteristics (Brothwell 1965:69)--could be used. With the exception of the basilar suture (McKern and Stewart 1957), cranial suture estimates were not always consistent with estimates derived using the other criteria, and are not considered reliable (see Brooks 1955:588).

#### Description of Individual Burials

##### 1-122-1A-F2-B1 (B38) Adult Female

This adult female, whose age at death is estimated to have been 25-30 years, was highly fragmentary and had probably been scattered by settling and rodent activity. The absence of complete long bones is due to the settling and disturbance. No pathologies were noted, and the only anomaly observed was the presence of a septal aperture in the distal portion of the left humerus. Using Bass' criteria (1971:115), the aperture is of medium size. The presence of the septal aperture

is reported to be more common in females (Hrdlicka 1932:431-450). The general gracility of the bones is consistent with a female.

Dentition is incomplete and consists entirely of loose teeth. Normal wear is present and the only features of interest are an abbreviated root on  $I^1$  (left), and slightly shovel-shaped incisors.

Cranial capacity was not estimated due to the fragmentary condition of the bones.

Stature was estimated from a partial radius as  $152 \pm 5.1$  cm. The radius is not the preferred bone for stature estimation, but in this case, the estimate is not unreasonable and can be accepted with some confidence.

1-122-2D-B2 (B39) Infant Female

This infant female burial had been severely disturbed, presumably by rodent activity. Several ribs and vertebrae were found within the cranium. Age at death is estimated at .5-1.5 years. Although most of the postcranial skeleton is fragmentary, a right ilium is available and was used to assess sex (Rhine, personal communication). No pathologies were found. The blade of the vomer is deviated to the right, a condition which is fairly common in modern populations. The sixth cervical vertebra shows partial closure in the right transverse foramen, which might be a harmless idiosyncrasy or might indicate a neurological disorder. The vertebral column is incomplete, and no serious anomaly is visible.

Dentition is essentially complete and still in place. No anomalies are present. Age of the individual is based on the eruption of the teeth. An estimate of cranial capacity was not possible.

1-000N/130E-2D-B1 (B40) Child Female

This badly disturbed burial is probably a female whose age at death was about 8 years. While all portions of the skeleton (except the pelvis) are represented, the bones are fragmentary and in poor condition. No pathology or anomaly was noted.

Only loose teeth are available. The eruption of  $M_1$  combined with the noneruption of  $M_2$  and  $M_3$  produced an estimate of age. Cranial capacity was not estimated.

1-300N/331E-5B-B2 (B41) Infant

This infant is probably the remains of a reburial. The few bones found were in and around a pot, and only the ulna and humerus were still in anatomical relationship. The skull was not found. No anomalies or pathologies are visible.

Age was estimated, using Johnston's tables for the estimation of age from the diaphyseal length of long bones, as about 1.5 years.

Cranial capacity could not be estimated.

1-300N/331E-5C-B1 (B42) Child Male

This child, whose age at death is estimated as approximately 2.5 years, was found in highly disturbed condition, most of the surviving bone having been packed within the cranium by rodents; a rodent nest was inside the skull. No anomalies or pathologies were present.

Dentition consisted of loose teeth, and no abnormalities were noted.

The reconstructed calvaria yielded an estimated cranial capacity of about 975 cm.

1-000N/130E-2E-B2 (B43) Adult Female

A flexed burial in excellent condition, this female is estimated to have been at least 25 at death. As with many of the burials found within the trash deposits, the portions of the body nearest the bottom of the pit tend to be fragmentary due to decomposition in the ground-water which collects beneath the body.

No skeletal pathologies were noted. There is a small exostosis of unknown origin on the superior proximal left fibula and a linear exostosis in the trochlear notch of the left ulna. Both exostoses are similar to those found with early arthritis, although the individual is still quite young to have incurred more than a suggestion of osteoarthritis. Two small sesamoid bones were found, one in each tarsal region. As sesamoids develop fairly often in this population, these two are not unusual.

Burial 43 is characterized by extensive premortem tooth loss and two root abscesses, one below M<sub>2</sub> (right) and one above P<sup>4</sup> (right). P<sup>4</sup> and M<sup>1</sup> (right), M<sub>2</sub> (right), P<sub>4</sub> and M<sub>1</sub> (left) were all lost pre-mortem. The remaining teeth are healthy.

Cranial capacity is estimated as 986.3 cm. The skull shows symmetrical lambdoidal flattening.

Based on the average of the six long bones, a stature estimate of  $155.3 \pm 4.0$  cm. was produced.

1-087S/121E-2I-B1 (B44) Child Male

This 8-10 year old male was found lying on his right side in a fully flexed position. Several indications of a general bone pathology are present: (1) the interior of the frontal shows several small areas of erosion where the internal periosteum is missing and rounded depressions are developing; (2) bodies of the thoracic and cervical vertebrae show erosion often extending across most of their anterior portions; (3) the mastoid process shows extensive erosion of the type often associated with typical mastoiditis, a disease usually found in adults and the elderly; (4) the sacrum shows non-union of the laminae on all segments except S-2. This bone pathology of the axial skeleton may be connected with the death of the individual, although the precise nature and origin of the condition are unknown. The condition of the sacrum is a further indication of bone and spinal abnormality and could have also been contributory to death. The sacrum shows spina bifida occulta, which is sometimes accompanied by neurological stress and can lead to death (Anderson 1948:1355).

The dentition is worn, but healthy.

Cranial capacity is estimated as about 1050 cm. Moderate symmetrical lambdoidal flattening is present. A wormian bone (ca.  $2 \times 1.5$  cm) is present in the right lambdoidal suture approximately .8 cm from lambda.

1-000N/130E-2I-B3 (B45) Elderly Adult Male

This very interesting burial of a 40-45 year old male was found in fully flexed position within a distinctive interment pit. Many of the typical signs of advanced age are found in this individual: (1) atrophic thinning is present in the scapulae; (2) the long bones show typical osteoporosis; (3) arthritis is present in the vertebrae, long bones, on the patellae, and the bones of the hands and feet. Three particular skeletal anomalies are of interest: (1) S-5 and the coccyx are fused; (2) each tarsal region shows a lateral sesamoid (ca.  $1 \times 1$  cm); (3) each patella shows a semi-circular notch on the lateral superior border. The notches are an idiosyncratic anomaly, with no known pathological or developmental origin.

The distal left femur shows a pathology which has accelerated the porosity of the bone and produced several distinctive conditions. On the posterior surface, centered approximately 1 centimeter above the epicondyles, there is a large hole (1.6 cm in diameter). An undiagnosed infection is present from the hole through the shaft of the femur to the lateral anterior surface, and all of the intervening bone is extremely porous. The condition may be the result of a puncture of the distal femur by a sharp object. The infection and porosity noted are subsequent to the trauma.

As would be expected in an individual of this advanced age, the dentition is in poor condition. Premortem loss has occurred; M<sub>3</sub>, M<sub>2</sub>, I<sub>1</sub>, I<sub>2</sub> (left) and P<sub>3</sub> and M<sub>1</sub> (right) have been lost from the mandible, and M<sup>2</sup>, M<sup>1</sup>, P<sup>3</sup> (left) and P<sup>4</sup> and M<sup>2</sup> (right) have been lost from the maxillae. Caries are numerous: P<sub>4</sub> (left) and C (left) in the mandible both show occlusal caries which extend into the root cavity and have resulted in abscesses below the gum line. In the right maxilla M<sup>1</sup> shows a caries on the buccal surface and a very large abscess above the tooth in the alveolar process. P<sup>3</sup> (right) has a well developed occlusal caries. The right upper canine shows a large occlusal caries and a very large root abscess in the maxilla above.

Burial 45 represents a relatively large individual and the estimate of cranial capacity (1351 cm) reflects that fact. The cranium shows assymetrical lambdoidal flattening, the right side having been deformed to a much greater degree than the left. Stature has been estimated, using a complete left femur, as 171±3.8 cm.

1-000N/130E-2H-B4 (B46) Adult Male

This adult male, whose age at death was about 35 years, was found lying on his right side in a flexed position. Most of the bones are slightly damaged, but the skeleton is well represented. The cranium is fragmentary, making an estimate of cranial capacity impossible. No anomalies or pathologies were noted.

Arthritic lipping, commonly associated with aging, is visible on all vertebrae and is most pronounced on the cervicals. The carpals and the left patella also show some lipping. Of the dental apparatus, only the mandible survives, and the mandibular dentition is in good condition. There appears to have been congenital absence of M<sub>3</sub> (left), a condition which is fairly common in modern populations. M<sub>1</sub> (right) shows a small caries on the mesial surface, but all remaining teeth are healthy and show normal wear for an individual of this age. Stature was estimated, from a left femur, as 167±3.8 cm.

1-000N/120E-2E-B5 (B47) Adult Male

Burial 47 was found lying in a flexed position on its back, the skull having been displaced about a full roll to the left. The skeleton is weathered and most of the bones are partially damaged. An estimate of age was possible, however, as about 35 years. The skeleton shows typical arthritic exostoses on the left calcaneus, right first metatarsal, left patella, where a notch similar to those noted on the patellae of Burial 45 is present. As with the notches in Burial 45, there does not appear to be a traumatic or pathological explanation and idiosyncratic anomaly seems to be the most satisfactory origin for the condition.

As is the case in individuals over 30 in this population, tooth loss and decay are extensive.  $I_1$ ,  $M^2$ ,  $M^1$ ,  $P^4$  (right),  $I^1$ ,  $I_1$ ,  $M^2$  (left) have all been lost premortem. An abscess is present below  $P_3$  (right), and caries are found in left  $M_3$  (buccal) and between  $P^4$  and  $M^1$  (left).

Cranial capacity is estimated at 1163.5 cm. Three small (.5 cm diameter) ostermata are present on the exterior frontal bone. Such bone growths are found occasionally and are considered benign (Brothwell 1965:141). The origin and cause of these benign exostoses is unknown.

Stature is estimated, from a left femur, as about  $171 \pm 3.8$  cm.

1-133-4A-T1-B1 (B48) Infant

This very fragmentary infant was found below the floor of room 133, and is probably fetal or newborn. The burial was extensively disturbed by rodents and most of the bones had been gnawed by rodents. No assessment of age or sex was possible. Pathologies and anomalies could not be surveyed.

1-000N/120E-2E-B6 (B49) Adult Male

A semi-flexed male, whose age at death was between 30-35 years, these remains are in fair condition. No anomalies are noted. The second cervical body shows slight anterior arthritic lipping, as do the superior anterior crests of the tibiae. The left tibia shows marked exostoses progressing around the shaft from below the superior fibular articular surface to the popliteal line. The head of the left tibia is rotated on the shaft approximately 20 degrees.

A spiral fracture which has healed would produce the compensatory exostoses and the displacement of the head.

The dentition of Burial 49 was healthy; caries are present only on the occlusal surfaces of M<sub>2</sub> (left) and M<sup>2</sup> (right). M<sup>3</sup> (right) was lost premortem. The remaining teeth are healthy and show normal wear for this population. The right maxilla contains a supernumerary incisor, but no unusual crowding is present in the maxilla.

Cranial capacity is estimated as 1478.8 cm. The cranium shows assymetrical lambdoidal flattening, with the emphasis on the right side.

Stature is estimated from a left femur as about 169.3±3.8 cm.

1-134-5B-B1 (B50) Infant

This infant, whose age at death is estimated (on the basis of tooth crown development) at less than 6 months, is very fragmentary and was severely disturbed. Sex could not be determined. Anomalies and pathologies could not be surveyed.

1-134-5C-T1-B2 (B51) Adult Male

This adult male, whose age at death was about 40 years, was found lying on his right side, with a large bowl fragment covering the face. The skull was, therefore, well preserved, while the rest of the skeleton was broken and often fragmentary. The vertebrae show normal resorption and very slight lipping, but no signs of advanced age are obvious. Two sesamoid bones were found in the tarsal regions of each foot. The spinous processes of the sacrum have been fused into a single spine, rather than the usual separate spines for each element of the sacrum. No pathologies were noted.

Premortem tooth loss has been severe in both the mandible and the maxillae. Left and right M<sub>2</sub> and M<sub>3</sub> have been lost from the mandible, and all molars have been lost in the maxillae. M<sub>1</sub> (left) has been almost completely eroded by a large caries on the occlusal surface. P<sup>3</sup> (left) shows a large caries on the mesial border of the occlusal surface. A typical mandibular torus is present along the left horizontal mandibular ramus, extending from M<sub>1</sub> to C.

Cranial capacity has been estimated as 1258.6 cm. A right fibula yielded a stature estimate of 168.2±3.2 cm.

1-000N/120E-2F-B7 (B52) Adult Female

Only the mandible survives intact for this fragmentary adult female with an estimated age at death of 20-25 years; all other bones are incomplete or fragmentary. No pathologies were noted, and the only anomaly of interest was the presence of a wormian bone in the left lambdoidal suture (2.2 x .6 cm).

Both  $M_3$  are completely erupted but are only slightly worn, indicating a fairly young individual.  $M_1$  (left) was lost premortem, and  $M_1$  (right) shows two caries on the occlusal surface. The dentition which remains is in good condition and wear has not progressed to any great degree.

Cranial capacity and stature could not be estimated.

1-000N/126E-B8-15.68BD (B53) Elderly Adult Male

The oldest skeleton in the collection this season, this individual is estimated to have been over 50 years of age at death. As might be expected of an individual of this advanced age, numerous anomalies and pathologies are present: (1) the left femur shows an exostosis of unknown origin (3.9 x 1.5 cm) at midshaft along the linea aspera; (2) the first coccygeal segment is fused to one another; (3) the left tarsal region contained one small sesamoid; (4) the trochlear notches of the ulnae are severely lipped; (5) the pubes show progressive resorption immediately behind the pubic symphysis; (6) four of the lumbar vertebrae (L2-L5) are fused by a large arthritic exostosis along the right anterior bodies. This lumbar ankylosis and accompanying stiffness of the lower back, combined with a pronounced tilt of the entire fused region to the left, has produced several interesting conditions in the lower appendicular skeleton. (7) The first and third metatarsals and proximal first and third toe phalanges exhibit highly polished secondary wear facets which may be the result of an altered gait due to the lumbar pathology; (8) the patellae and the distal femora show advanced osteoporosis and (on the patellae) an L-shaped exostosis on the articular surface.

Although it is not clear exactly what the connection between the patellar pathology and the lumbar pathology might be, it is possible that the remodeling of the patellae could be the result of an adjusted gait.

The dentition of this individual is also very interesting. The maxillae are completely edentulous and the sockets have been totally resorbed,

indicating that all the upper teeth had been missing for a number of years before death. The mandible shows premortem loss of  $M_2$  and  $M_3$  (left) and  $M_1$  and  $M_2$  (right); but all remaining teeth are healthy, if worn. As a result of the absence of teeth in the maxillae and the subsequent shrinkage of the alveolar process, a severe underbite is present. The increased mobility of the mandible due to the lack of occlusion with any maxillary teeth has led to the obliteration of the lateral and medial borders of mandibular fossae and the expansion of bicondylar width. A small root abscess below  $I_1$  (left) is the only remaining evidence of dental disease, although a periodontal disease is the probable cause of the edentulous maxillae (Brothwell 1965:147).

Cranial capacity is estimated as 1556.7 cm, which is large for this population, consistent with recent expositions of increase in cranial capacity with age (Israel 1973). Symmetrical lambdoidal flattening is present.

Stature was estimated as 166.1 $\pm$ 3.8 cm on the basis of a left femur.

1-280N/340E-2A-B1 (B55) Adult Male

The last burial recovered this season was a highly fragmentary, flexed male whose age at death was over 30 years. Precise aging was impossible, given the condition of the bones. No pathology or anomaly was visible.

The available dentition gives no evidence of premortem loss or dental disease. The remaining teeth are worn but healthy.

Stature and cranial capacity could not be estimated.

Conclusion

The burials recovered during the 1976 field season are similar to those excavated in previous seasons. Dentition is typically poor; arthritis is the most common pathology; and no clear indications of lethal physical trauma are present.

Eight of the 18 burials were children or infants. No adolescents were found. Of the 10 adults, two (Burials 45 and 53) had lived to an advanced age. Life expectancy appears, on the basis of the skeletal collection, to have been short, about 30-35 years.

This collection of burials from Tijeras Pueblo appears to represent a fairly typical Southwestern population. It is hoped that funds and time will be available in the near future to examine the relationship of the inhabitants of Tijeras Pueblo to other Southwestern populations.

Table 1

L. A. 581--Summary Table \*t tt

	<u>B38</u>	<u>B39</u>	<u>B40</u>	<u>B41</u>	<u>B42</u>	<u>B43</u>	<u>B44</u>	<u>B45</u>	<u>B46</u>
Age	25-30	.5-1.5	8	1.5	2.5	2.5	8-10	40-45	~35
Sex	Female	Female	Female	Male	Male	Female	Male	Male	Male
Stature	152.0±5.1							171.0±3.8	167.0±3.8
Cranial Capacity									
				~975		986.3	~1050	1351	
	<u>B47</u>	<u>B48</u>	<u>B49</u>	<u>B50</u>	<u>B51</u>	<u>B52</u>	<u>B53</u>	<u>B54</u>	<u>B55</u>
Age	35	Fetal	30-35	<.5	40	20-25	50+	1.5	30-35?
Sex	Male		Male	Male	Female	Female	Male		Male
Stature	171.0±3.8		169.3±3.8	168.2±3.24			166.1±3.8		
Cranial Capacity									
				1478.8		1258.6		1556.7	

\* Age is given in years

t Stature is given in centimeters

tt Cranial capacity is given in cubic centimeters

Table 2

Cranial Measurements \*  
and Indices

	B38	B39	B40	B41	B42	B43	B44	B45	B46	B47	B48	B49	B50	B51	B52	B53	B54	B55
Maximum length					16.5	15.5	16.5	16.9		18.2	17.5		18.7			16.3		
Maximum breadth					12.2	15.2	14.5	16.4		13.5	15.2		12.6			16.7		
Minimum frontal					7.4	9.3		10.5		10.4		9.6		9.7		10.2		
Basion-bregma									12.7		11.7		14.7		13.6		15.5	
Circumference					45.5	47.5	50.0	50.8		51.5		50.5		50.0		52.0		
Auricular height					11.0	10.7	10.6	12.2		11.6		12.9		11.3		13.6		
Total facial height					10.2		11.3		13.0		12.1		13.0		13.0		11.0	
Upper facial height						5.7		6.9		7.5		7.4		8.2		6.9		
Bizygomatic width							15.2		13.8							13.8		
Nasal height							5.0		5.5		5.5					4.9		
Nasal breadth							2.5		2.5		2.6		2.3					
Nasion-basion							8.1		7.7		9.7		10.5			10.3		
Basion-prosthion							8.0		7.6		9.5		10.0			8.3		
Orbit height (left)							4.0		3.5		3.5		3.7					
Orbit height (right)							3.7		3.7							3.9		
Orbit width (left)							4.0		4.0		3.9		3.9					
Orbit width (right)							3.7		4.1							4.2		
Palate length							5.0		5.3		4.8		4.7			4.5		
Palate breadth							6.3		6.1		6.5		5.7					
Palate height							1.1		1.5		1.7		1.4		1.4			
Foramen magnum length																	3.2	
Foramen magnum width																		

Table 2 (Continued)

	B38	B39	B40	B41	B42	B43	B44	B45	B46	B47	B48	B49	B50	B51	B52	B53	B54	B55
Mandible length	4.1					7.8	8.6	8.4	9.4	8.6		8.9		8.2	7.1		8.3	4.6
Bicondylar width	7.5				12.0		13.3	12.0	11.8		12.3					13.6		
Bigonial width	5.6			10.7		10.6	10.1	10.5		10.5		9.0				10.4		
Ramus height (left)	2.5				5.0	5.0	6.5	6.3	6.7		6.5				5.8	5.1	5.7	
Ramus width (left)	1.8				3.2	2.9	3.6	4.1	3.7		3.5				3.4	3.2	3.1	
Sympphyseal height	1.8				3.4	2.4	3.0	3.2	3.1		3.7				3.9	2.3	3.4	1.7
Interforaminal width	3.3				4.6		5.0		5.0		4.6				4.1	4.5	4.8	3.4
Gonial angle	41°				39°	26°	29°	22°	15°		17°				24°	36°	33°	41°
Body height ( $M_2$ )	1.5				2.4	2.1	2.6	3.3	3.0		3.0				2.2	2.1	2.6	1.5
<b>INDICES</b>																		
Cranial		73.9	98.1	87.9	97.0		74.2		86.9		86.9						102.5	
Height-length					75.1		64.3		84.0		72.7						95.1	
Height-breadth					77.4		86.7		96.7		107.9						92.8	
Auricular height-length		66.6	64.2	72.2		63.7		73.7		60.4						83.4		
Fronto-parietal		60.7	61.2		64.0		77.0		63.2		77.0						61.1	
Crano-facial					92.7	102.2										82.6		
Craniom module					153.3	144.7		158.0		149.7						161.7		
Left orbital					100.0	87.5		89.7		94.9								
Right orbital					100.0	90.2											92.9	
Mean orbital					100.0													
Nasal					50.0			45.5	47.3									
Upper facial					45.4		54.3									64.5		
Zygogo-gonial					69.7		76.1									75.4		

Table 2 (Continued)

	B38	B39	B40	B41	B42	B43	B44	B45	B46	B47	B48	B49	B50	B51	B52	B53	B54	B55
<u>Fronto-gonial</u>									100.9	101.0	109.4		92.8		102.0			
<u>Zygo-frontal</u>									69.1	75.4							73.9	
<u>External palate</u>									126.0	115.1	135.4		121.3					
<u>Gnathic</u>									98.8	98.7	97.9		95.2				80.6	
<u>Ramus</u>	72.0				64.0	58.0	55.4	65.1		55.2		53.8		58.6	62.7	54.4		
<u>Mandibular</u>	55.0				65.0	63.2	78.3	72.9		72.4					61.0			

\* Measurements are given in centimeters

Table 3

Postcranial Measurements \*t  
and Indices

	B38	B39	B40	B41	B42	B43	B44	B45	B46
Humerus length	8.5 / -	17.5 / -	- / 11.0		27.8 / 28.6		32.6 / 32.5		
Humerus head diameter					3.7 / 3.6		4.7 / 4.5		
Humerus proximal width					3.9 / 4.5		5.4 / 5.0		
Humerus distal width					5.5 / 5.5		6.0 / 6.1		
Humerus A-P diameter					1.7 / 1.8		2.3 / 2.4		
Humerus M-L diameter					2.0 / 2.2		2.5 / 2.4		
Ulna length			- / 9.6	9.9 / -	23.0 / -		27.0 / -		
Ulna shaft length					20.5 / -		24.5 / -		
Tróchlear height					1.6 /		1.5 / 1.5		
Ulna distal breadth					1.7 /		2.0 / / -		
Radius length	20.5 /			8.8 /	21.3 / 21.2		24.0 / 25.7	25.5 / -	
Radius distal width					2.6 / 2.5		3.5 / 3.4	3.0 / -	
Femur length	25.4 / -	14.0 / -	- / 14.2	36.6 / 36.3		45.8 / 45.7	43.9 / 43.4		
Femur bicondylar length				36.1 / 36.2		45.4 / 45.0	43.8 / 43.3		
Femur A-P subtrochanteric width		1.5 /			2.0 / 2.2		2.7 / 3.0		
Femur M-L subtrochanteric width		2.6 /			2.5 / 2.8		3.5 / 3.4		
Femur A-P midshaft width	1.7 /			2.4 / 2.4		3.1 / 3.0			
Femur M-L midshaft width	1.6 /			2.2 / 2.3		2.6 / 2.6			
Femur head diameter				3.6 / 3.7		4.6 / 4.3			
Femur epicondylar width				6.2 / 6.3		7.1 / 7.6			
Tibia length	9.1 / -			11.3 / -	31.2 / 31.0	23.2 / -	38.6 / 38.6	37.7 / 38.6	
Tibia physiological length					30.3 / 30.4		37.2 / 37.1	36.6 / 37.0	

Table 3 (Continued)

	B38	B39	B40	B41	B42	B43	B44	B45	B46
Tibia proximal end diameter					6.1/6.1	4.3/-	-/7.8	6.8/-	
Tibia A-P diameter					3.0/2.8	2.4/-	4.0/4.1	4.1/4.1	
Tibia M-L diameter					1.8/1.8	1.8/-	2.6/2.7	2.2/2.0	
Fibula length					30.5/30.8	23.0/-	37.7/37.5	37.0/-	
Clavicle length	-/12.7	-/16.1			-/13.2	9.7/-	15.6/15.4		
Innominate height	18.2/-				17.2/-				
Innominate breadth									
Maximum pelvic breadth									
Sagittal pelvic inlet width									
Transverse pelvic inlet width									
Sagittal pelvic outlet width									
Transverse pelvic outlet width									
Sacral height							13.3/-		
Sacral breadth							11.5/-		
INDICES									
Left radius-humerus					76.6		73.6		
Right radius-humerus					74.1		79.1		
Left femur-humerus					75.9		71.2		
Right femur-humerus					78.8		71.1		
Left humerus head					14.0		16.6		
Right humerus head					15.7		15.4		
Left humerus distal end					19.8		18.4		
Right humerus distal end					19.2		18.8		
Left platymeric	71.4				80.0		77.1		

Table 3 (Continued)

	B 38	B 39	B 40	B 41	B 42	B 43	B 44	B 45	B 46
Right platymeric					78.6			88.2	
Left pilastric		106.2			109.1			119.2	
Right pilastric					116.7			115.4	
Left platymeric					60.0	75.0	65.0	53.7	
Right platymeric					64.3		65.9	48.8	
Left tibia-femur					86.4		85.0		
Right tibia-femur					85.6			85.8	
Mean innominate									
Total pelvic									
Pelvic inlet									
Pelvic outlet								86.5	
Sacral									
Left robusticity					12.6		12.4		
Right robusticity					12.9		12.3		

\* For each individual, the left measurement is given first.

t Measurements are given in centimeters.

Table 3 (Continued)

	B47	B48	B49	B50	B51	B52	B53	B54	B55
Humerus length		33.2/33.6					30.9/31.8	10.0/10.0	
Humerus head diameter		4.6/4.6					4.4/4.9		
Humerus proximal width		5.3/5.4					5.0/5.5		
Humerus distal width		6.5/6.5					6.3/6.5	2.7/2.7	
Humerus A-P diameter		2.2/2.2					2.2/2.2	1.0/1.0	
Humerus M-L diameter		2.1/2.2					2.4/2.0	.9/1.0	
Ulna length	26.5/26.7						25.4/25.7	9.0/9.1	
Ulna shaft length	24.0/24.0						23.5/23.4	7.9/8.1	
Trochlear height	1.6/1.5	-/1.9		1.3/-	-/1.6		1.5/1.8	.8/.6	
Ulna distal breadth	-/2.2						2.0/2.3	.9/.9	
Radius length	24.4/-			23.8/-			23.7/24.2	8.0/8.0	
Radius distal width	2.1/-	-/2.1		-/3.0			3.2/3.7	1.5/1.4	
Femur length	45.8/-		45.0/-				43.5/42.8		
Femur bicondylar length	45.5/-	44.8/-					43.3/43.1		
Femur A-P subtrochanteric width	2.8/2.8	2.8/2.3					2.9/2.9		
Femur M-L subtrochanteric width	2.8/2.8	3.1/3.4					3.0/3.0		
Femur A-P midshaft width	3.5/3.5	3.1/3.0					3.1/3.1		
Femur M-L midshaft width	2.5/2.5	2.6/2.4					2.6/2.5		
Femur head diameter	4.3/4.5	4.4/4.3					4.3/4.4		
Femur epicondylar width	7.8/7.6	7.3/7.3					7.7/7.6		
Tibia length	38.7/38.0						36.3/36.2		
Tibia physiological length	37.0/37.2	36.8/36.4					34.8/34.5		

Table 3 (Continued)

	B47	B48	B49	B50	B51	B52	B53	B54	B55
Tibia proximal end diameter	- / 7.6		- / 7.6						7.6 / 7.77
Tibia A-P diameter	4.0 / 3.8		4.5 / 4.0						3.6 / 3.4
Tibia M-L diameter	2.3 / 2.3		3.4 / 2.1						2.5 / 2.3
Fibula length	37.3 / -			- / 36.5					34.3 / 34.2
Clavicle length					14.8 / -			6.2 / 6.2	
Innominate height								20.8 / 20.6	
Innominate breadth									
Maximum pelvic breadth									
Sagittal pelvic inlet width									
Transverse pelvic inlet width									
Sagittal pelvic outlet width									
Transverse pelvic outlet width									
Sacral height									
Sacral breadth									
INDICES									
Left radius-humerus						76.7		80.0	
Right radius-humerus						76.1		80.0	
Left femur-humerus					73.7		71.0		
Right femur-humerus							74.3		
Left humerus head					16.0		16.2		
Right humerus head					16.1		17.3		
Left humerus distal end					19.6		20.4	27.0	
Right humerus distal end					19.3		20.4	27.0	
Left platymeric					100.0	90.3			96.7

Table 3 (Continued)

	B47	B48	B49	B50	B51	B52	B53	B54	B55
Right platymeric	100.0		67.6					96.7	
Left pilastric	140.0		119.2				119.2		
Right pilastric	140.0		125.0				124.0		
Left platycnemic	57.5		75.6				69.4		
Right platycnemic	60.5		52.5				67.6		
Left tibia-femur	85.1						83.8		
Right tibia-femur							84.0		
Mean innominate									
Total pelvic									
Pelvic inlet									
Pelvic outlet									
Sacral									
Left robusticity	13.1		12.7				13.1		
Right robusticity							13.1		

\* For each individual, the left measurement is given first.

t Measurements are given in centimeters.



References

- Anderson, W. A. D., Ed.  
1948      Pathology. C. V. Mosby Co., St. Louis
- Bass, W. M.  
1971      Human Osteology. University of Missouri, Columbia.
- Brooks, S. T.  
1955      Skeletal Age at Death: The Reliability of Cranial and  
              Pubic Age Indicators. American Journal of Physical  
              Anthropology 13(4):567-597.
- Brothwell, D. R.  
1965      Digging Up Bones. British Museum, London
- Graves, W. W.  
1922      Observations on Age Changes in the Scapula: A Pre-  
              liminary Report. American Journal of Physical  
              Anthropology 5:21-31.
- Hrdlicka, A.  
1932      The Principal Dimensions, Absolute and Relative, of  
              the Humerus in the White Race. American Journal of  
              Physical Anthropology 16:431-450.
- Israel, H.  
1973      Age Factor and the Pattern of Change in Craniofacial  
              Structures. American Journal of Physical Anthropology  
              39:111-128.
- Johnston, F. E.  
1962      Growth of the Long Bones of Infants and Young Children  
              at Indian Knoll. American Journal of Physical Anthro-  
              pology 20:249-254.
- Krogman, W. M.  
1972      Child Growth. University of Michigan, Ann Arbor.
- Lange, C. H.  
1968      Cochiti: A New Mexico Pueblo, Past and Present.  
              Southern Illinois Press, Carbondale.

- Lumpkin, C. K., Jr.  
1976     A Multivariate Craniometric Analysis of Selected Southwestern Archaeological Populations. Ph.D. Dissertation, University of New Mexico.
- Meredith, H. V.  
1946     Order and Age of Eruption for the Deciduous Dentition. Journal of Dental Research 25(1):43-66.
- McKern, T. W. and T. D. Stewart  
1957     Skeletal Age Changes in Young American Males, Analyzed from the Standpoint of Identification. Technical Report EP-45. Headquarters Quartermaster Research and Development Command, Natick, Massachusetts.
- Olivier, G.  
1969     Practical Anthropology. Thomas, Springfield.
- Todd, T. W.  
1920     Age Changes in the Pubic Bone I: The Male White Pubic. American Journal of Physical Anthropology 3:285-334.
- Todd, T. W. and D. W. Lyon, Jr.  
1924     Endocranial Suture Closure: Its Progress and Age Relationship. American Journal of Physical Anthropology 7(3):326-384.
- 1925     Cranial Suture Closure: Its Progress and Age Relationship. American Journal of Physical Anthropology 8(1):23-45.
- Trotter, M. and G. C. Gleser  
1952     Estimation of Stature from Long Bones of American Whites and Negroes. American Journal of Physical Anthropology 10:463-514.
- 1958     A Re-evaluation of Estimation of Stature Based on Measurements of Stature Taken During Life and of Long Bones after Death. American Journal of Physical Anthropology 16:79-123.

Appendix C

Teaching Assistant  
Report 1976 Season

by  
Brona G. Simon



During the 1976 University of New Mexico archeological field session, crews under my supervision concentrated their efforts on the excavation of Room Block VIII. Room Block VIII is a small (approximately 100 feet by 100 feet) mound on a slope at the base of a hillside covered with juniper and sandstone rock outcrops. It lies about 200 feet due east of the great kiva. The existence of Room Block VIII has been known by archeologists since at least 1930 when Mera recognized sets of rooms he named Mounds E, F and G in that area (Judge 1974: 5-6). Mound F is Room Block VIII. In 1973, members of the UNM field school, under the direction of Dr. Judge, surface collected and stripped two-thirds of the grids laid out on the mound to .3 foot below ground surface. Judge (personal communication 1976) reported that no structures had been found. However, as it seemed to us at the beginning of the summer that there might indeed be a structure on Mound F, we excavated .5 foot deeper than Judge's crews and found wall and room configurations.

Our goals in excavating Room Block VIII included the following: (1) to determine the time and extent of occupation in relation to the main mound; (2) to determine the number of rooms; (3) to excavate a sample of the rooms to the floor and test below the floor; (4) to excavate an adequate trash sample associated with the site; and (5) if possible, to determine the social and economic relationship of Block VIII to the main mound.

We were also concerned with obtaining a trash sample from Room Block VI, originally labeled Mound K (Judge 1974:49), which lies about 100 feet north of the main mound. A date of A.D. 1313 had been acquired from room 12 of Block VI in 1971 (Judge 1974:11, Appendix A), thus placing it in the early occupational period of Tijeras Pueblo. The excavation of a trash sample from Room Block VI, as well as from Block VIII, was seen as potentially helpful for our focus on the problem of the relationship between population size and resource availability at Tijeras (Judge 1974, Cordell 1975, and this report). Another useful purpose the trash sample could fulfill would be to give us an idea of the relative ceramic frequencies associated with early occupations.

It was hoped that Room Block VIII would also be dated to the early occupational period. The ceramics obtained from Block VIII seem to support this expectation. A few small dendro samples were taken from various rooms and grids in Block VIII. The few tree-ring samples at Room Block VIII support that this outlier was occupied

and abandoned earlier than at least one of the building phases of the main mound at Tijeras, and that the wood from Room Block VIII may have been reused by later occupants of the pueblo.

#### Field Techniques

Excavation of Room Block VIII posed a number of methodological problems. Due to the highly eroded condition of the outlier, the surface jumble of rocks offered no clues to the whereabouts of walls. Therefore, we began by excavating three full 10' x 10' grids with the intent of locating rooms and a 3' x 10' trench to determine the depth of occupation in the northern portion of the mound. These activities proved successful, resulting in the discovery of rooms 129 and 130 and the relative shallowness of cultural material (to a depth of approximately 3 feet below surface).

Once the four walls of both rooms 129 and 130 had been clearly defined, we attempted to use a new procedure for locating additional rooms. This procedure entailed the excavation of 4' x 4' test pits placed at locations where, by extrapolation of wall lengths known from rooms 129 and 130, we estimated room corners should be found. Our first two tests were successful. They located the corners of rooms 134, 135, and 136. However, when we tried to extrapolate from these tests, we were not so fortunate. Our extrapolation technique operated under the assumptions that rooms were nearly the same size and that crosswalls were composed of unbroken lines. The architecture of Room Block VIII did not follow these rules consistently. Rooms varied in size and crosswalls did not always form regular intersections. Therefore, we reverted back to our initial method of excavating total grids in order to delineate additional rooms, and replaced the method of excavating extrapolated test pits with that of digging trenches which followed the course of an established wall. This combination of techniques proved to be successful with the discovery of room 133 and its three, possibly four, neighboring rooms. Trenching along known walls was easiest when the wall was made of adobe. When the wall was masonry, rockfall on either side made it more difficult, though not impossible.

Using these procedures, we located 12 probable rooms in Block VIII; rooms 129, 130, 134, 135, 136 are in the northern part of the mound and room 133 and its surrounding rooms in the southern part (map 7). Grids 280N/320E and 200N/340E were excavated for the purpose of locating connecting rooms between these two sections of the site. Grid 280N/320E unearthed a masonry wall running northeast to

southwest, parallel to walls of the same direction in the northern part of the mound but not to the walls of room 133. No walls extending toward room 133 were found in this grid. Grid 280N/340E contained no evidence of any structures, although it was typified by a matrix of hard packed adobe wash which had probably eroded from nearby rooms. This evidence suggests, then, that Room Block VIII had been comprised of two architecturally separate structures.

A rough estimate of the total number of rooms in Block VIII derived from this summer's activities would be about 18 or 20. The western edge and southwest corner of the mound, however, were not explored. Judging by average room size and surficial topography, I would guess that the maximum number of rooms in Block VIII would be about 25. We completed excavation of five rooms this year, thus providing us with a 43.6% sample at best, or a 20% sample at worst.

In one corner of each room, we excavated a 3' x 3' test pit below the floor until we reached culturally sterile soil. Through this means, we determined that there were no earlier building phases at Block VIII previous to the constructions we excavated. We also learned that rooms 129 and 133, whose floors rested on sterile soil, might have been the earliest rooms built in Block VIII. The other rooms were characterized by a small amount of cultural material below them, implying that they had been added onto previously occupied rooms.

The quantity of surface stones and rocks on the mount initially suggested that Room Block VIII might have been made entirely of masonry. We discovered that both masonry and adobe had been used. Since the standing height of walls above floor level rarely exceeded 2 feet, it is likely that wall footings were made of masonry or adobe or a combination of both. The relatively small amount of rock fall (certainly not enough to have been used for a 5'-6' wall) and the nature of fill, hard-packed adobe, imply that most of the walls were adobe, not masonry.

#### Room 129

Architectural evidence indicates that room 129 is one of the oldest rooms in Room Block VIII. It was built with three footings of masonry and one of adobe. Two highly eroded tan adobe floors were discovered almost superimposed with a separation of .01'-.3' between them. These were about 1.5' below the ground surface, or 2.52' above datum (AD) and 2.32' AD respectively. The lack of fill

between the floors indicates remodeling rather than abandonment and reoccupation. There were no floor features associated with room 129. We did find one possible posthole and an ash lens on the lower floor. It is most probable that because of its size (8.25' x 7.25') and the absence of floor features, that room 129 might have been used for storage.

A test pit excavated in the north corner of the room encountered sterile soil in the first level below the floor. The north and west walls appear to terminate at floor 4B level. Room 129 yielded 55.7% "early" ceramics and 44.3% "late" ceramics.

#### Room 130

Lying to the northwest of room 129, room 130 is larger (9.5' x 7.9') and probably had been built later than room 129 because its floor rested on 1 foot of cultural material deposits, even though its "early" to "late" ceramic ratio is 62.7%:37.3%. This room had three adobe and one masonry wall footings. The floor was located only 1.3' below surface, or at 3.12' AD, was in fairly good condition, and made of a pink-grey layer of adobe over a layer of small stone cobbles. An interesting feature which included two pink adobe copings surrounding some small stones rested on the floor along the east wall near the southern corner of the room. It was in this corner that we excavated the test pit to sterile. In level 5B-T1, a bison calcaneus was recovered.

#### Room 133

This is the only room we excavated in the southern portion of Room Block VIII. We found it in very bad condition. The southern wall, half adobe, half masonry, was slumped inward, giving the room a trapezoidal rather than rectangular shape. The west wall was also made of adobe and masonry. The other two walls were adobe. We did find a very good section of the pink-grey-white adobe floor along the northern edge of the room. It was 1.7' below surface (.97' AD). Again, there were no floor features. The subfloor test pit in the northeast corner revealed the disturbed burial of a human fetus (#1-133-4A-T1-B1) at .67' AD. Pieces of floor were mixed in the fill surrounding the burial, indicating that it had been interred after the room had been built. Except for the burial, the first level of the test pit was sterile, attesting to the early relative date of construction. The frequency of "early" to "late" ceramic types was almost identical to that of room 129: 57.1%:42.9%. The absence of floor features also suggests that room 133 might have served as a storage facility.

### Room 134

Because of its small size (3.5' x 9'), the nature of its fill (mostly clay), and the female adult burial (#1-134-5C-T1-B2) found within it, room 134 was the most anomalous and interesting room of Block VIII. The presence of unfired and fired clumps of clay, a small piece of unattached red slip, polishing stones and a piece of raw temper (gypsum) suggests that this room had been related to pottery production, perhaps a storage area for raw material and pottery tools. It is interesting to note that the woman buried underneath all this paraphernalia was accompanied by two very large sherds--one large piece of corrugated utility ware covered her face entirely and a large piece of Agua Fria redware was beside her chest, interior side up.

Room 134 had four masonry walls and may have been divided in half at one time by a line of stones across the shorter side. A grey adobe floor was discovered covering the area south of this line of stones. It was 1.4' below ground surface (2.0' AD). A fragmentary infant burial (#1-134-5B-B1) was removed from the level below the floor in the south half of the room. B2, the female adult burial, was also found in the south half of the room, a foot below B1. Sterile was reached in level 5E (.3'-.8' BD).

A very small sample of painted wares (45) resulted in an 80% "early" to 20% "late" distribution of ceramic types, but the architectural evidence points to a more recent construction date than that of room 129.

### Room 135

Room 135 is located to the southwest of room 130 and the southeast of room 134 and is contiguous with both. All four walls had masonry footing. The first floor encountered, 4A, was made of grey adobe and had an average depth of 2.38' AD, or 1.6' below surface. There were five interesting and atypical floor features. Located in the center of the southern half of the room was a circular firepit or ashpit with a diameter of 1.5' with an encompassing adobe coping and a lining of stone slabs at its base. To the southeast of the firepit was a 4-foot long line of masonry with adobe mortar. This was parallel to the southeast wall and connected with the southwest wall at a right angle. Its function is not known. It possibly could have been some sort of room divider. It probably was not a deflector, as there was no evidence for the existence of a ventilator

opening to the southeast of it. Northwest of the firepit were three small circular holes, .2' to .5' in diameter. We had thought these were postholes because their interior faces were made of regular, smoothed adobe. However, the holes do not run straight vertical courses; they are at oblique angles to the floor, implying rodent activity. In the west corner of room 135, a cluster of several sandstone slabs was found. We suspect that these may have been a support base for a roof or a wall support post.

In excavating a subfloor test pit in the north corner of the room, a second grey adobe floor, 4B, was discovered. It was only .1' below 4A, suggesting remodeling during one occupational period. One foot below 4B, in level 6B-T1, two distinct ash lenses were found. Sterile was reached 1 foot below the lenses, in level 6D-T1, at .68' to .48' AD. Because the fill below room 135 was characterized by trash deposits and was nearly 1.5' deep, this room had probably been built onto a room or set of rooms that had already been occupied for some time. A comparatively small sample of sherds from room 135 were in a ratio of 57.9% "early" to 42.1% "late."

#### Trench 300N/331E

This 3' x 10' test trench was excavated to determine the depth of Room Block VIII. Sterile was reached at 1.13' to .63' AD (2.85' to 3.58' below the ground surface), indicating that we were dealing with very shallow deposits of cultural material.

Trench 300N/331E cut across two rooms. Masonry crosswalls as well as separate floors in the northern and southern halves of the trench were discovered. On the grey adobe floor, 4A (2.43' AD) in the northern part of the trench, associated with room 136, we found a firepit made of stone slabs and adobe. The grey clay-adobe floor in the southern portion of the trench was located at 2.13'-2.03' AD. Two very fragmented burials were found in the southern section. Burial #1-300N/331E-6A-B1 was a child accompanied by a small, whole plainware pot. Burial #1-300N/331E-5B-B2 was an infant without a skull associated with several large utility ware sherds and may have been a secondary burial in a pot.

#### Room Block VIII Trash

The search for trash deposits associated with Block VIII was a long and arduous task. Grid 200N/370E was finally chosen to supply our trash sample. Unfortunately, this grid contained only 2.4' of trash

deposits and skirted the edge of masonry footings which probably were part of the room block to the south of Block VIII (Mound E on Mera's map) (Judge 1974:6). Its association with Room Block VIII is tenuous, although it is probably contemporary. The sample was adequate in respect to ceramic, lithics and bone; but the faunal remains were highly fragmentary. It appears that Room Block VIII served the same function as the main mound, that is, as an occupation area characterized by rooms with different functions, human burials, and normal trash deposits.

The ceramics from 200N/370E were mostly plainwares. Level 1A contained the largest sample of decorated pottery, 131 sherds, which were in a ratio of 77.8% "early" to 22.2% "late" types.

A heavy deposit of trash was found in the southeast half of grid 280N/320E. This area was directly outside a room. Frequencies of 51.6% "early" and 48.4% "late" ceramics characterized level XA. Level 2A contained only 53 painted sherds for a 67.3%:32.7% "early" to "late" distribution.

#### Room Block VI

As stated earlier, our intent in Room Block VI was to obtain a trash sample. Judge (1974:49) had proposed that this was a 6-room outlyer. Two of our test pits this summer uncovered additional masonry walls and, therefore, rooms. The estimate for the size of Room Block VI has now been expanded to 12 to 15 rooms.

Grid 160N/030E was excavated as the trash sample. Very large quantities of ceramics, lithics and faunal remains were collected from the 3' of deposits. The breakdown of "early" to "late" ceramics is as follows: Level 1A--36.7%:63.3%; level 2A--48.1%:51.9%; level 2B (very small sample)--59.1%:40.9%.

#### Summary

Our excavated sample of five rooms from the estimated 20-25 rooms contained rooms indicating varied functions. Rooms 129, 133, and 135 may have been storage rooms. Rooms 130 and 136 (tested only) could have been living rooms. Room 134 served some special function. This variation among rooms plus the presence of multi-component trash deposits suggest some degree of economic and social autonomy for the members of Block VIII in respect to other room blocks. The fact that Room Block VIII was divided in half

implies that either two separate families or one family and a warehouse for storage were located on the mound. It is difficult to infer the social relationship between the people at Block VIII and those at the main mound other than to suggest that they might have all made communal use of the great kiva which lies between them.

References

Cordell, L. S.

1975      The 1974 Excavation of Tijeras Pueblo. Arch.  
Report No. 5. USDA Forest Service, Southwest  
Region, Albuquerque.

Judge, W. J.

1974      The Excavation of Tijeras Pueblo 1971-1973: Pre-  
liminary Report. Arch. Report No. 3, USDA  
Forest Service, Southwest Region, Albuquerque.



**Appendix D**

**Teaching Assistant  
Report 1976 Season**

**by  
Stephen L. Fosberg**



During the final season of excavation at Tijeras Pueblo, many of the goals of my group of students were met. Other objectives, unfortunately, had to be abandoned due to unexpected discoveries encountered in room 108. We concentrated our efforts this year on Room Blocks II and III in an attempt to define the vertical extent of room 108, to sample as many early rooms as possible from the northern perimeter of the main mound, and to clarify the complicated offset architecture in the northwest area of the pueblo. We had hoped to dig through the floor 4A of 108, quickly encounter bedrock, and proceed to extend trenches G and H to the south and west (map 10). However, two additional floors, a myriad of subfloor features, and recognition of a mural required the presence of a 4-member crew in the kiva for the entire season. In an attempt to meet our second goal, rooms 122 and 132 were excavated, both of which proved to be early. Finally, the horizontal extent of earlier masonry structures was revealed with the testing carried out in rooms 59 and 51 in Room Block III.

#### Room 108

During the previous season, Brona Simon's crew excavated this kiva down to the first floor level in the eastern half of the room. This year, we began digging at a depth of 3.3' below the surface and, because of time constraints, were forced to limit our work also to just the eastern half of room 108. By the time floors of the room underneath this kiva were discovered, simply too much dirt would have had to have been moved in a very short time span. (It is hoped that during the academic year, several students will complete the excavation as a special project.)

Our crew first stripped off a .3' thick 5A layer and then arbitrary 1.0' levels of 5B and 5C in an attempt to reach bedrock rapidly. Corresponding amounts of soil were removed from the kiva's sub-floor ashpit, firepit, and cist and bagged separately.

The 5B level revealed seven small circular ash deposits. They averaged .4' in diameter and consisted of undifferentiated ash with a few scattered, charred twigs throughout. All seven ashpits aligned in an east-west direction, averaging .52' apart and lying approximately 3.0' south of the kiva's north wall.

With the removal of 5C (7.95-8.95' BD), students uncovered 12 postholes .25' in diameter in the southern half of the room that also formed an east-west line curving slightly at the eastern edge

to the north. Further digging revealed a stone-lined ashpit and finally a black adobe floor at 8.44' BD.

At this point, to avoid confusion, we relabeled the room 128 with the recently discovered floor identified as 4A.

### Room 128

After the students troweled off the material directly above 4A, they sunk a 3' x 3' test through levels 5A, 5B, 5C, and 4B. These layers then were removed from the entire room in arbitrary .5' levels. 5A contained several bison foot bones at a depth of approximately 8.6 BD. Within this layer, at an average depth of 8.6' BD, the bottoms of the seven aligned ashpits were located.

No new features were encountered in 5B which was characterized by a silty matrix with abundant limestone cobbles throughout.

To better determine the lateral extent of 128, slump in front of the eastern and northern walls of 108 was removed and in the 5C layer at a depth of 9.35-9.85' BD, six additional postholes appeared 1.0' from the kiva's eastern wall. Pieces of wood were recovered from two of them. Since the floor of 128-4A could only be followed up to the eastern and southern postholes, 128's horizontal extent was only defined in those two directions.

In the process of clearing back to 108's eastern wall, a student discovered a piece of plaster from room 108's wall with red and green colors on one layer. After Dr. Frank Hibben verified the presence of painting, efforts were directed at preserving the plastered surfaces so that the wall could be removed to the lab for future analysis. We divided both the northern and eastern kiva walls into sections which were removed separately. Each of the wall segments was numbered and a sketch made of all of them in place to facilitate eventual reconstruction. The technique in each case involved building up a cap of plaster just above the wall segment, anchoring wet toilet paper to it, then covering this tissue with more wet plaster. Burlap and plaster were applied to the back of the wall, then the section was undercut, tilted back, and slipped down a wooden ramp. Although a detailed study of the mural is in progress, it is interesting to note that in addition to several geometric designs in black and white, red figures, a possible kachina and deer, were discovered during the wall's removal.

As was the case with 128-4A, the second floor of room 128 was well defined in the northern portion of the room but appeared only in a few visible patches near the southern postholes. This darkened and hardened adobe floor featured a circular, subfloor ashpit lined with adobe. It measured 1.4' in diameter and extended .65' deep, containing ash and small fragments of charcoal.

Finally, the students sank two 3' x 3' tests and in both cases encountered sterile. T2 in the northwest corner of the area hit green and purple limestone pebbles at a depth of 10.42' BD in 6A, while T3 in the southern part of our room reached limestone cobbles in 6B, 10.42-10.82' BD.

The presentation of these many overlapping features may sound somewhat confusing; nevertheless, the sequence of their construction probably occurred as follows. The inhabitants laid down floor 4B of 128 directly over sterile limestone pebbles just above bedrock. Exact lateral dimensions of 4B were impossible to determine as no walls were encountered and the postholes associated with 4A ended above the earlier floor. However, because 4B could not be located outside the postholes of 4A, it seems likely that it too was defined by an area approximately equal to that of 4A. The subfloor ashpit was dug into the limestone chips below floor 4B. During the construction of 4A, the walls of 4B were removed and the material scattered across the room to be replaced by walls with interior post supports. Some 1.57' of rocks and soil containing relatively few sherds with no discernible pattern of increase in late redwares from top to bottom were deposited before 4A was completed. Following the construction of the floor, a square, stone-lined ashpit was set up. Some 2.05' of fill separate 128-4A from 108-4A. Here the percentages of late redwares compared to earlier ceramic types increased from 5C to 5A in the following proportions: 10.8/88.7, 21.9/77.9, and 25.1/74.1. Ceremonial activities may be indicated by the seven aligned ashpits which extended from .15' below 108-4A to .25' below 128-4A. The ash was probably associated with pre-floor events of room 108 and was subsequently covered over when 108-4A was laid down. The building of 108 has been positively dated at 1313 A.D. and the subfloor ashpit, firepit, and cist were dug at that time.

### Trench 025S/016E

Students undertook this small trench to clarify the relationship between room 108 and its surrounding room block by determining if neighboring walls abutted the kiva from the east. The trench extended from 25S to 40S and was dug in arbitrary .5' levels beginning with layer XA.

Levels XA through XD yielded a great deal of cultural material, and XE contained puddled adobe which might have resulted from an eroded wall or floor. Although the trench could not be completed due to a lack of time, eventually level 2B was reached at a depth of 7.86'-8.36' BD. The trench profile exposed many lenses of charcoal in surrounding silt and adobe. A lack of ash layers suggested that we were not in real trash per se; rather, we probably dug just below the eroded upper occupation rooms and above the lower occupation structures. In any event, the objective of the trench was met: no walls joined the subterranean kiva from the east.

### Room 122

In the process of leveling off the room and defining the south and east walls, a highly disarticulated skeleton was located in the southwest corner area in 1A. Since the bones were so scattered and incomplete, the burial probably was secondary having eroded down the hill from the main mound.

Fill in the room consisted of lenses and chunks of eroded adobe. In the 2D level, 8.86'-9.36' BD, a complete turkey skeleton lay only a few inches above and to the northwest of an infant burial. Though the interment was somewhat disturbed due to weathering, most of the human bones were located. 2E proved extremely rich in fauna, yielding five turkeys and a nearly intact canid.

Dark only slightly packed adobe over angular cobbles made up the floor 4A. The floor contained no features. Sterile was soon located in the 5B level (10.71'-11.21' BD).

Unfortunately, no tree-ring samples were recovered in the excavation of this room. However, the facts that late redware types decreased from 72.1% in the first level of fill to 32.0% on the floor and that the room rests on sterile ground would seem to suggest that it does represent an early occupation structure.

### Room 132

Originally the crew in this area began digging a 10' x 10' trash grid; but, upon hitting a floor, we decided to excavate the room since its shallow deposits, very badly eroded condition, and position at the extreme north of Room Block II all indicated an early occupation room.

The floor appeared as puddled, darkened adobe, only moderately compacted, that had been eroded and badly buckled in places. On the floor, students recovered three restorable utility vessels, a 4" x 3" cross-grooved shaft smoother, numerous manos, and a small, whole plainware pot. No floor features were present. A second floor located .2' below 4A had probably been remodeled to form the upper surface. No features or artifacts were located on the light buff, hard-packed, 4B level. Subfloor tests extended through a 6A (11.5'-12.0" BD) to a 6B layer. The first contained many bones, sherds, fragment of a bone flute, bone awl and corn-cobs in a matrix of silt, while the second hit sterile brown clay chips.

This room's thin deposits (4A lay 1.8' and 4B 2.0' BSD), redware percentages decreasing from 46.5% at the surface layer to 24.4% for 4A and 8.2% for 4B, and construction on sterile soil again confirmed that the room was early.

### Room 59

After leveling off the room, the crew dug a 3' x 3' test pit in the southwest corner. Not until the 2F layer was removed was the floor located at a depth of 4.50' BD (3.85' BSD). The silty, clayey fill contained many pebble-sized adobe bits with occasional large pieces or lenses of adobe wash.

The junction of the west and south adobe walls revealed that the former served as the main buttressing wall with the latter merely attached to it as was the case in room 60. Plugged doorways appeared in the east and south walls.

The floor, 4A, consisted of buff, dry, compacted adobe free from any signs of burning. Very little cultural material was associated with the floor. The room most likely served as a storage area.

In a subfloor test, angular limestone cobbles were erroneously interpreted as footing for an eroded floor. (We later discovered that these rocks were weathered cobbles lying directly above bedrock.) Consequently, levels 5A and 5B were stripped from the entire room exposing massive masonry walls offset approximately 1 foot trending parallel to the north and east walls of room 59. These lower structures comprised the western and one-half of the southern walls of room 110 plus the west wall of the room under room 17. The latter, as was the case with the western wall of room 107 (Simon 1976:119), was much thicker than the north-south wall and apparently served as an outer boundary for the early period of occupation.

To determine how the masonry related to the sloping bedrock, layers 5C-5E were stripped from areas outside the stone walls. These lower walls rested on soil only .1' above the flat, solid sheets of bedrock (average depth 6.5' BD) that dip to the northeast.

#### Room 51

To delimit the extent of the earlier masonry construction on this part of the main mound, room 51 was tested. Students excavated the first floor of this room in 1971, and room data records noted the presence of two "possible" additional floors located in a 3' x 3' test pit. Our crew failed to detect these features. Several red clay lenses encountered in our tests may have been previously mistaken for floors. Rather than dig the entire room, we sank four test pits looking for floors or lower masonry walls. T4 along the east wall proceeded in 1' levels down to 2F or 6.15'-7.15' BD, without hitting any masonry. Sterile cobbles above bedrock were reached.

#### Summary and Interpretations

Overall, the goals of our group were met this season. The most significant discovery in terms of altering the interpretation of Tijeras Pueblo was the uncovering of two additional floors deep below room 108. Room 128 may also have served as a kiva before work on 108 was begun. The earlier room did contain numerous kiva characteristics, such as a firepit, a subfloor ashpit, bison bones below its first floor, ochre-coated rocks, an extremely well made adobe floor, and large dimensions. Though the lateral extent of 128 could only be defined to the south and east by the presence of postholes, as presently excavated, the room extended minimally 17.0' in a north-south direction and 10.0' east-west.

The two rooms excavated at the north of Room Block II are interpreted as early rooms, since both were constructed on culturally sterile ground. The deposits in each were rather shallow, and the walls and floors poorly preserved, especially in room 132. Their presence at the extreme north portion of Room Block II gives further credence to the proposition that the first period of occupation was indeed the largest on the main mound (Cordell 1975:32).

Our work on the northwest portion of the main mound in rooms 59 and 51 exposed the fact that the masonry room block underneath 102 and 59 did not extend to the west of room 110. Thus, the room block probably included only five or six rooms (Loose 1975:67). They were deliberately leveled so that the upper adobe room block could be constructed en masse with walls set up only a few inches from the masonry structures without utilizing them for buttressing or footing.

With the final season of field work completed at Tijeras Pueblo, many of the gaps in our understanding of the pueblo were filled in. Certainly the excavation of rooms 51, 59, 122, 132, 108, and 128 contributed to this end. All the students in my group, therefore, are to be thanked heartily for a job well done\*.

---

\*Crew members were J. Clark, T. Davidson, S. Myer, G. Lawrence, D. McBride, B. O'Leary, K. Pilkington, R. Roibal, M. Schoch, and L. Stiver.



References

- Cordell, Linda S.
- 1975      The 1974 Excavation of Tijeras Pueblo, Arch. Report No. 5, USDA Forest Service, Southwestern Region, Albuquerque.
- Loose, Ann A.
- 1975      Appendix D to Linda S. Cordell The 1974 Excavation of Tijeras Pueblo, Arch. Report No. 5, USDA Forest Service, Southwestern Region, Albuquerque, 56-58.
- Simon, Brona
- 1976      Appendix D to Linda S. Cordell The 1975 Excavation of Tijeras Pueblo, Arch. Report No. 6, USDA Forest Service, Southwestern Region, Albuquerque, 113-140.



Appendix E

Teaching Assistant  
Report 1976 Season

by  
Charles K. Lumpkin, Jr.



### Goals and Strategies

The goals of the crews working under my direction were threefold: (1) to determine the extent of the initial occupation in the main mound south of Room Blocks I and II, (2) to determine the extent of the middle occupation plaza in the same area, and (3) to excavate trash and rooms which could be attributed to the initial occupation.

In order to accomplish the first two goals, three trenches were excavated. Trench C (042S/080E) was continued east to intersect with a portion of Trench D (060S/121E), which had been excavated during 1975. Trench D was continued southward to link Room Block V with Room Block I. Trench I (050S/036E) was extended from Trench C on the north to room 85. In relation to the third goal, rooms 126, 131 and area 125 were excavated as well as the two trash grids (000N/120E and 000N/130E). Both trash grids were located north of the initial occupation north wall and south of the north wall of the middle occupation.

### Results and Interpretations

Two floors were located in Trench C (042S/080E) at levels 2L and 2N, the first associated with a collapsed firepit. The depth below datum (18.16'-19.66'), as well as evidence of the later plaza surface at level 2H (16.16'-16.66' BD), indicates that the two floors are remnants of the initial occupation of the main mound. These two floors disappeared in the eastern quarter of the trench probably as the result of erosion. Culturally sterile soil was reached in level 2P in the western end of the trench and in level 2J in the eastern end.

Three floors were located in Trench D (060S/121E). These were found between levels 2G and 2I (17.7'-19.2' BD). This type of remodeling is characteristic of initial occupation rooms. Levels 2J and 2K were sterile. It appears, therefore, from the excavations in Trenches C and D that the initial occupation construction continues extensively beneath the later, middle occupation plaza.

In Trench C, evidence of the middle occupation plaza surface and two postholes in levels 2G and 2H (15.66'-16.66' BD) were approximately on the same level as the adobe basin (excavated in 1974) which rested on the middle occupation plaza (map 5). In Trench D, a dark compact clay layer in level 2E, charcoal and the remains of

a pot indicate the badly eroded remains of the middle occupation plaza floor in this part of the main mound.

Trench I (050S/036E) was excavated in order to tie the architecture of Room Block II to that of Room Block IV. This goal was accomplished in that the north walls of rooms 80 and 81, which had not previously been mapped, were located. The north-south wall dividing these two rooms was located as well, and rooms 137 and 138 were defined (map 1b). The subfloor test in room 138 encountered culturally sterile soil in level 5C. As in the eastern section of the main mound, Trench I demonstrated the extensive nature of the initial occupation.

Room 127 (map 9) was the only middle occupation room excavated. It contained several interesting features including (1) the remains of a second-story floor, firepit and roof fall; (2) the ground level floor with associated fire and ash pits; and (3) the remains of the offset, initial occupation room floor, the corner of which appeared in Trench D (map 1b).

Two grids of trash which could be related to the initial phase of construction were excavated north of Room Block I. These were 000N/120E and 000N/130E. Abundant ceramic, lithic and faunal remains were recovered from each grid. The grids were excavated in arbitrary 0.5' levels. The skeletal remains of eight individuals were excavated from these two trash grids.

Rooms 126, 131 and area 125 (maps 8 and 1b) were excavated in order to increase our sample of initial occupation rooms. Room 131, in Room Block I, consisted only of a slab floor and the east wall. No floor features were encountered. The slab floor may either represent an outdoor work area or the floor of a storage room from which all but one wall had eroded. A subfloor test in the northeast corner of the room revealed some cultural material immediately below the floor and sterile in level 5F.

Room 126, also in Room Block I, has four adobe walls and a slab and cobble floor. The room lacked floor features and, again, may have served as a storage room. The north-south room walls are the major bearing walls. The west wall appears to have been added onto the room, because the slab floor continued beyond it. The room had been built on culturally sterile ground.

Area 125, in the central portion of the main mound, was begun late in the season in the hopes of excavating an initial period room which was later covered by the middle occupation plaza. Unfortunately, definition of a room was not possible in that no floor was reached, and the walls which were exposed did not relate to the same room. Fill in this area consisted of eroded adobe, adobe chunks, and mixed debris associated with remodeling.

#### Summary

The excavations of my crews were generally successful. The first two goals outlined previously have been accomplished allowing a more detailed knowledge of the floor plans of both the early and middle occupations of the main mound. The third goal, dealing with increasing the sample of early trash and rooms, has also been completed; and further analysis should provide interesting comparisons.





